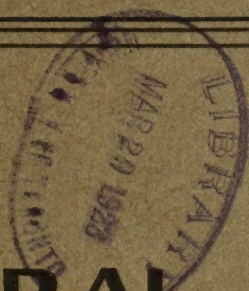


G. P. C.
Agric
A

Biological
& Medical
Serials

THE AGRICULTURAL GAZETTE OF CANADA



Vol. X

March-April, 1923

No. 2

LEADING TOPICS

Departmental Assistance to Marketing
Influence of Feeding on Type of Hog
Experiments in Tobacco Culture
Potato Inspection and Certification
The Royal Agricultural Winter Fair
Agricultural Instruction and Rural Citizenship
Alberta's Dairy Industry
Boys' and Girls' Clubs and Farm Boys' Camps
Irrigation in Alberta
Admission of Canadian Cattle to Great Britain
The World's Live Stock

DEPARTMENT OF AGRICULTURE
OTTAWA, CANADA

STORAGE

The Agricultural Gazette of Canada is published bi-monthly, in English and in French, by the Dominion Department of Agriculture, Ottawa.

The aim of The Agricultural Gazette is to provide a source of information as to the policies and activities of the Dominion Department of Agriculture and of the Provincial Departments of Agriculture and of Education, so far as the work of the latter relates to Agricultural Education. Besides being a publicity medium, it constitutes a comprehensive record of the progress and development of departmental effort on behalf of Agriculture in Canada.

The Agricultural Gazette is not intended for general distribution. It is sent free to official workers and teachers, including school teachers who have agricultural teaching qualifications; to members of parliament; to libraries; to the Press; to Immigration and Trade agents, and, as an exchange, to agricultural institutions in other parts of the Empire and in foreign countries.

A limited number of copies are available to subscribers at \$1.00 per annum, or 20 cents per copy.

Subscriptions should be addressed to the Editor

DOMINION OF CANADA
DEPARTMENT OF AGRICULTURE
PUBLICATIONS BRANCH

Vol. 10: No. 2

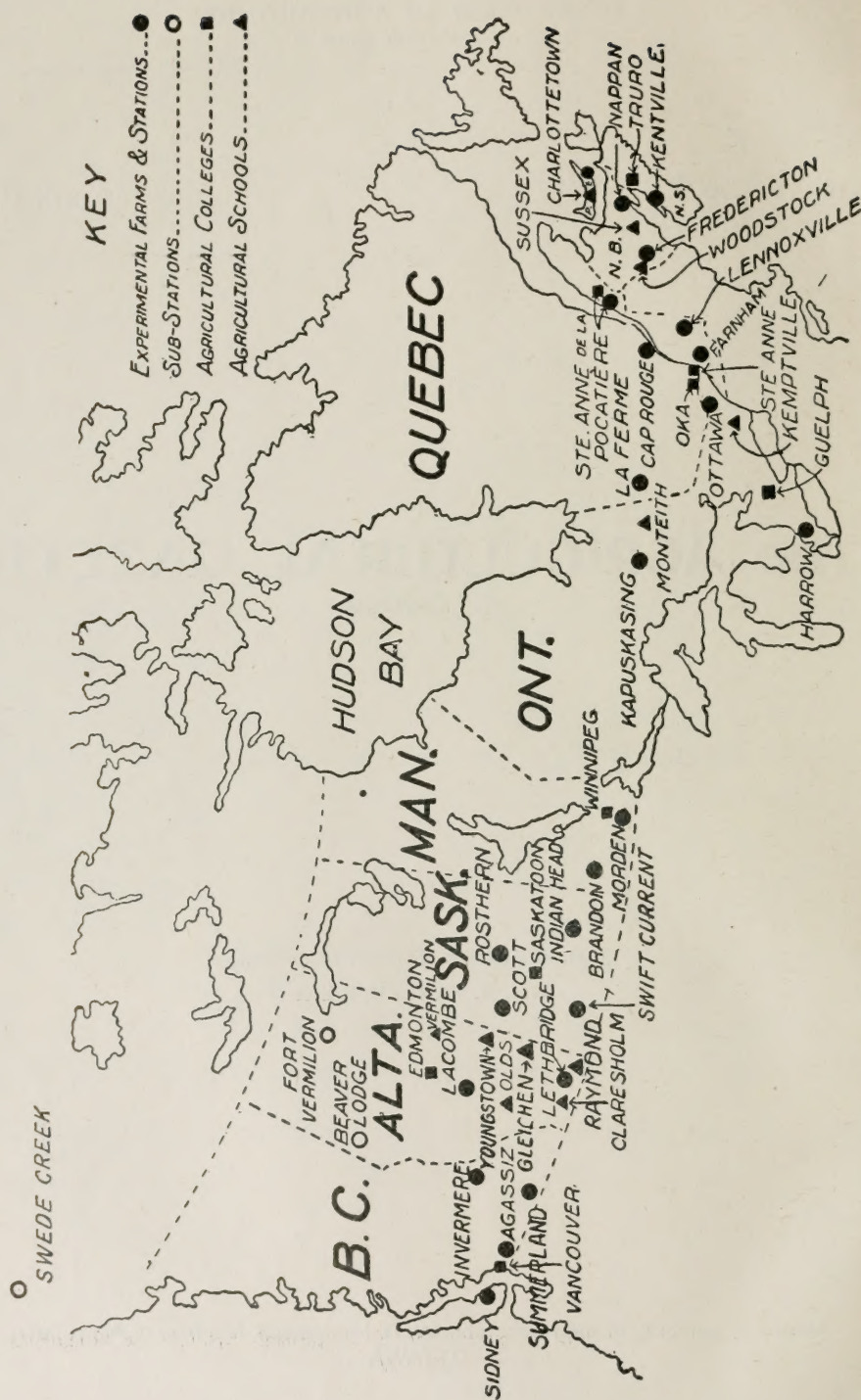
March-April, 1923

The AGRICULTURAL GAZETTE OF CANADA

J. B. SPENCER, Director of Publicity

Wm. B. VARLEY, Editor

Issued by authority of the Honourable W. R. Motherwell, Minister of Agriculture
OTTAWA



MAP OF CANADA SHOWING THE LOCATION OF FARMS, STATIONS AND SUB-STATIONS IN THE EXPERIMENTAL FARMS SYSTEM, THE AGRICULTURAL COLLEGES AND AGRICULTURAL SCHOOLS

CONTENTS

PART I

DOMINION DEPARTMENT OF AGRICULTURE

	PAGE
DEPARTMENTAL ASSISTANCE TO MARKETING.....	105
INFLUENCE OF FEEDS AND FEEDING ON THE TYPE OF MARKET HOGS, by G. B. Rothwell, Dominion Animal Husbandman.....	110
EXPERIMENTS IN TOBACCO CULTURE, by D. D. Digges, Superintendent, Dominion Tobacco Station, Harrow, Ont., and J. E. Montreuil, Superintendent, Tobacco Station, Farnham, Que.	116
POTATO INSPECTION AND CERTIFICATION IN CANADA, 1922, by Geo. Partridge, Division of Botany.....	121

PART II

PROVINCIAL DEPARTMENTS OF AGRICULTURE

THE ROYAL AGRICULTURAL WINTER FAIR, 1922, by R. W. Wade, Director Live Stock Branch, Ontario Department of Agriculture.....	124
THE TEACHING OF AGRICULTURE AND DOMESTIC SCIENCE IN QUEBEC, by A. Desilets, Quebec Department of Agriculture.....	127
THE AGRICULTURAL INSTRUCTION ACT AND ITS EFFECT ON RURAL CITIZENSHIP IN MANITOBA, by S. T. Newton, Superintendent, Extension Service.....	129
THE RECONSTRUCTION OF ALBERTA'S DAIRY INDUSTRY.....	131
MEETING THE FARMERS' FERTILIZER NEEDS HALF-WAY, by O. C. Hicks, B.S.A., Superintendent of Soils and Crops, New Brunswick.....	134
PROVINCIAL POTATO FAIR, by J. B. Munro, B.S.A., Soil and Crop Instructor, British Columbia.	136

PART III

AGRICULTURAL EDUCATION AND RELATED ACTIVITIES

SASKATCHEWAN BOYS' AND GIRLS' CLUBS, by Fred W. Bates, B.A., M.Sc., Director of Rural Education Associations, and Harry Saville, B.S.A., Organizer.....	138
THE SASKATCHEWAN FARM BOYS' CAMPS—WHAT THEY ARE AND HOW THEY SERVE THE BOYS OF THE PROVINCE, by K. W. Gordon, Assistant Director of Agricultural Extension... ..	140
AGRICULTURE IN THE NOVA SCOTIA SCHOOLS, by L. A. DeWolfe, B.A., M.Sc., Director of Rural Science.....	143
DEVELOPMENT OF SCHOOL AGRICULTURE IN ALBERTA, by G. B. Van Tausk, M.A.....	145
THE USE OF BULLETINS AND PAMPHLETS IN THE SCHOOLS, by J. W. Firth, B.A., Normal School, Toronto.....	147

PART IV

SPECIAL CONTRIBUTIONS, REPORTS OF AGRICULTURAL ORGANIZATIONS. PUBLICATIONS AND NOTES

IRRIGATION INVESTIGATIONS IN ALBERTA, by W. H. Snelson, Senior Irrigation Specialist.....	148
DOMINION AGRICULTURAL LEGISLATION.....	153
THE ADMISSION OF CANADIAN STORE CATTLE TO GREAT BRITAIN.....	154
CATTLE EXPORTERS' CONFERENCE.....	156
REPORT OF THE SPECIAL COMMITTEE ON FAIRS AND EXHIBITIONS.....	157
ADVISORY SEED BOARD MEETING.....	160
REPORT OF THE ONTARIO AGRICULTURAL DEVELOPMENT BOARD.....	161
CONFERENCE ON THE CONSERVATION OF WILD LIFE.....	161
THE FINCH DAIRY STATION REPORT.....	162
DOMINION EDUCATIONAL CHEESE SCORING CONTEST.....	163
THE DIRECTOR OF EXPERIMENTAL FARMS AND THE DOMINION ANIMAL HUSBANDMAN TO VISIT GREAT BRITAIN.....	164
THE CREATION OF THE DIVISION OF BACTERIOLOGY AT THE EXPERIMENTAL FARM.....	164
THE GIFT OF CERTAIN BREEDING ANIMALS TO CANADA BY THE BRITISH SHIRE HORSE ASSOCIATION.	165

The AGRICULTURAL GAZETTE

OF CANADA

VOL. X

MARCH-APRIL, 1923

No. 2

DEPARTMENTAL ASSISTANCE TO MARKETING

PRODUCTION is no longer the dominant note in agriculture. Except during the period of the war, the disposal of the products of the farm at a profitable rate has for many years more and more engaged the minds and energies of both farmers and officials. It is not only the finding of a consumer that concerns the producer, but also the securing of speedy and safe transportation, more particularly of the products classed as perishable. Many trained minds have given thought to this problem, and economists have worked hard and long to find the solution and to bring about improved conditions. System after system has been put to the test in an attempt to bridge the gap between producer and consumer and still conferences to thresh out the whole problem seem necessary.

The problem of marketing has engaged the attention of officials of the Department of Agriculture for many years. About twenty-eight years ago a step was taken towards safeguarding perishable products in transit to market. The icing of cars carrying butter during the hot summer months was the first important service put into operation. Transatlantic cargo inspection began five years later, and from time to time since then further services were undertaken until practically the whole range of farm products, with the exception of wheat and other grains, which are dealt with by the Department of Trade and Commerce, has come within the influence of the marketing services of the Department of Agriculture.

The services of the department directly related to marketing, and operated by the different branches, may be classified in five divisions:

1. (a) Standardization and grading for export;
(b) Standardization and grading for the home market.
2. Safeguarding perishable products in transit and the inspection of products at harbour terminals.
3. The promotion of co-operative marketing.
4. The regulation and control of stock yards.
5. Markets intelligence.

The necessity for standardizing and grading products that have to compete in the world's markets was never more apparent than at the present time. This was the conclusion of the Deputy Minister of Agriculture, Dr. Grisdale, when he studied the question in Great Britain in the summer of 1922. In his opinion, the only countries that were making progress in their export trade in agricultural products were those that presented their goods so graded and marked as to establish confidence in their quality.

The standardization and grading of agricultural products are carried out under the provisions of three Acts of Parliament—The Inspection and Sale Act, The Live Stock and Live Stock Products Act, and The Dairy Produce Act. In addition certain classes of seeds are graded for export under a ministerial order, the grade standards used being those provided in the Seed Control Act.

The Inspection and Sale Act, under which the grading and packing of fruit and vegetables is regulated, came into force in 1901 under the title of The Fruit Marks Act. In its original form it provided for the uniform packing of barrels and boxes of apples for export and the marking of closed packages according to the grades laid down in the regulations. The mark is required to indicate the variety, the grade, and the name and address of the packer. The Act has been amended from time to time until it covers both closed and open packages of fruit, whether for local markets, for export, or coming from other countries. This measure was until 1914 administered by the Dairy and Cold Storage Branch, when the Fruit Division of that Branch was made a separate Branch of the Department. In administering this law the official inspectors are stationed at assembling points and at the principal markets to examine samples of shipments and to see that they conform to the regulations.

The official grading of vegetables was brought within the administration of the Fruit Branch in 1922 by the passing of The Root Vegetables Act. This Act provides for the grading of potatoes and onions, the marketing of packages, and the sale of vegetables by weight.

The grading of eggs for interprovincial, export and import trade was undertaken by the Live Stock Branch about five years ago. The regulations governing this work are under The Live Stock and Live Stock Products Act of 1917. For the purposes of administration the Dominion is divided into eastern and western sections with the central line at Port Arthur. Inspection is made at principal shipping points to see that the eggs packed for shipment are graded according to legal standards and marked accordingly. The grades are Specials, Extras, Pullet Extras, Firsts

and Seconds. Dr. Grisdale, on his return from Great Britain, declared that Canadian eggs have an undisputed position in the British market due to the government grading regulations.

Hog grading was commenced in the fall of 1922, and has been established on a system agreed upon by representatives of hog raisers, bacon curers, marketing authorities, and the Live Stock Commissioner, under whose direction it is carried on according to regulations under The Live Stock and Live Stock Products Act. It applies to all hogs handled through the abattoirs for making Wiltshire sides and is intended primarily to stimulate the production of the bacon type so necessary to the export trade by securing to the hog raiser the true market value for his product. The grades provided are Select, Thick, Smooth, Shop Hogs, Heavies, Extra Heavies, Feeders, Roughs, Sows, and Stags. A premium is paid for hogs of select type. Inspectors are stationed at stock yards, abattoirs and other centres where the grading is done.

Dairy produce will come under official grading at the beginning of April, 1923. The grading will apply to butter and cheese, and will be carried out at central points whence these products are despatched for the overseas market.

In order to protect farmers against losses from the use of inferior seed, feeding stuffs and fertilizers, and to facilitate the distribution and sale of these commodities in the home market, three acts of Parliament are administered by the Seed Branch of the Department. These are the Seed Control Act, which provides for both compulsory and optional grading of seeds in respect of their purity and germination; the Feeding Stuffs Act, which provides that commercial feeding stuffs be sold subject to analysis of nutrition, and the ingredients from

which they are manufactured, and the Fertilizers Act, which provides that commercial fertilizers be sold subject to the percentages of the plant food substances, nitrogen, phosphoric acid and potash.

For purposes of administration, laboratories are maintained and operated at Ottawa, Toronto, Winnipeg and Calgary, and, in addition, thirteen laboratories connected with the Department of Health or Canadian colleges and universities provide analytical service in chemistry.

In order to enforce these Acts, the Dominion is divided into six inspection districts, and the inspection work in each of these is under the supervision of a district inspector for the purpose.

The seed of Canadian-grown fibre flax, alsike and red clover is graded for export by the Seed Commissioner. Flax seed grading was put into effect four years ago at the request of the Irish Board of Agriculture when seed was needed in Ireland for fibre flax production. The grading of alsike and clover seed is of recent adoption. These seeds are graded according to quality, purity and colour, certificates of grade being attached to sealed packages when ready for shipment. The selling of the seed for export on the basis of Canadian inspection for grades is optional with the exporter.

Safeguarding Perishable Products

For the purpose of fostering trade in food products, measures were put into effect to safeguard the condition of shipments in transit. In the year 1900 the Dairy and Cold Storage Commissioner instituted the Cargo Inspection Service. This provides for inspection of perishable products at Canadian ports on arrival at the docks for loading on ship-board. Inspectors take note also of the manner in which the handling and loading is done and report upon the number of

packages, marks, etc., of each consignment. Temperature records secured during the voyage and reports of the condition of shipments on landing are collected and made available to shippers. This service covers dairy products, fruits, meats, canned goods, and eggs. Reports of faulty conditions or handling of other than dairy products are transmitted to the respective branches of the department concerned with the product.

To minimize the deterioration of cheese and butter being hauled on railways to market in hot weather, the department, through the Dairy and Cold Storage Branch, operates refrigeration services. For cheese in carload lots travelling to Montreal, Quebec and Halifax, the Branch provides iced refrigeration during the months of June, July and August. Shippers of less than carload lots of cheese, butter and eggs are assisted through an arrangement with the railway companies to operate "pick up" refrigerator cars over specified routes leading to Montreal, Toronto and Halifax. This service operates from early in May until the end of September. For butter cars it has been in operation since the year 1895, while the iced cheese car service was started eight years later.

To maintain satisfactory temperatures for butter and cheese in transit, a system of inspection of iced butter and cheese cars is carried on. Shipments arriving in Toronto, Montreal and Halifax are examined by inspectors and reported upon with regard to the quantity of ice in the bunkers, the quantity of cheese and butter in the cars, the condition of the cars relating to cleanliness, temperature, and the manner in which the packages are stowed. Unfavourable conditions are reported to the persons responsible.

By arrangement with carrying companies, the Fruit Commissioner has been able to secure important im-

provements in the transportation of perishable fruit and vegetables. These have reference particularly to loading and unloading, favourable routing and rating, car fittings, stoppage and storage-in-transit privileges, etc.

The Promotion of Co-operative Marketing

Following a study of the sheep industry in Canada by a special commission in 1910, the Live Stock Commissioner took steps to promote the co-operative marketing of wool. Sheep raisers were encouraged to organize themselves into clubs and to avail themselves of the services of official graders. An outgrowth of this movement was the organization of the Canadian Co-operative Wool Growers, Limited. Short courses of instruction in wool-grading are conducted by the Live Stock Branch, and assistance is given by district sheep promoters in collecting and shipping wool on the co-operative plan. The co-operative marketing of sheep and lambs is also encouraged under the same direction through the organization of local associations. Assistance is provided in the marketing of both live and dressed sheep and lambs. The service includes sorting, shipping, prorating, and selling. Similar assistance is afforded in the Maritime Provinces to co-operative swine and cattle marketing, the purpose of which is to move the surplus above local demand.

Activities relating to the co-operative marketing of eggs by the Live Stock Branch commenced in 1912 by the organization of egg circles throughout the country. As a result of this work in Prince Edward Island, the Prince Edward Island Egg and Poultry Association was organized. Through this organization almost all poultry products of that province are now marketed co-operatively. Equally satisfactory results have ensued in British Columbia,

where the British Columbia Co-operative Exchange has become one of the largest handlers of eggs on the Pacific Coast. The carload shipment of live poultry, and to some extent, of dressed poultry, has been fostered, more particularly in New Brunswick and Prince Edward Island.

Regulation and Control of Stock Yards

Through The Live Stock and Live Stock Products Act, the Live Stock Commissioner was given control of the stock yards of the country. This policy was inaugurated for the twofold purpose of facilitating the handling of stock through the yards and of securing a disinterested control of marketing practices. Under this measure, all public stock yards are subject to federal supervision as regards construction, equipment and operation. The stock yards coming within the purview of this measure are located at Montreal, Toronto, Winnipeg, Moose Jaw, Prince Albert, Calgary, and Edmonton. At each yard, agents are stationed to see that the regulations are carried out, to collect market quotations for the head office of the branch and the press and to give assistance to farmers in the handling of their stock. The enforcement of regulations under this Act has resulted in the bonding of commission men operating on public stock yards, the organization of new, and the re-organization of old, live stock exchanges, the authorizing of standard regulations under which live stock exchanges operate, the standardizing of all charges made on the yards by the stock yard companies or by commission men, and improvement in the accommodation for live stock.

Market Intelligence Service

In agriculture, as in other industries, accurate information as to trade conditions, supply and demand, and current prices is necessary for

the guidance of producers. To supply this, various Branches collect and disseminate by telegraph, by mail and through the press, market news collected both at home and abroad.

A market intelligence service is maintained by the Live Stock, the Dairy, the Fruit, and Seed Branch of the Department. Market reports with respect to eggs, poultry and live stock are issued daily by the Live Stock Branch through the Canadian press. Reports on egg and poultry prices and supplies are transmitted to the head office of the Branch by officials stationed at the principal markets. These are compiled each day and appear the following morning in the daily papers of the country. The live stock daily market service is operated on much the same system. It consists of an analysis of the condition of supply and demand and the values of stock sold. The information is transmitted morning and evening by the officers of each of the stock yards. The morning reports appear in the principal dailies on the evening of the same day, and the afternoon reports on the following morning.

An inter-stockyards telegraph service is maintained in the form of an exchange of market telegrams between stockyards. This tends to equalize values the country over. These messages are prepared by the stockyard agents after careful analysis of the conditions of trade and exchanged daily with other yards in Canada.

During the season of heavy fruit marketing the Fruit Commissioner issues telegraphic market reports showing the wholesale prices, car arrivals and condition of all Canadian fruits and vegetables on the principal domestic and foreign markets. From the first of August until the end of the year these reports are issued twice weekly from Vancouver, B.C., Winnipeg, Man., and Ottawa, Ont.

From the beginning of the year until the first of August weekly telegraphic reports are issued from Ottawa only. Collect telegrams or night letters regarding quotations or conditions on any market at any time are despatched upon request.

Weekly market information with respect to eggs, poultry, live stock, wool, and dairy produce, is issued in multigraph form by the Live Stock Commissioner. The weekly egg and poultry market information is secured from British and United States egg-importing houses and from correspondents in Vancouver, Calgary, Edmonton, Regina, North Battleford, Montreal, and St. John. The weekly live stock market reports deal separately with each stock yard in Canada. They comprise an analysis of supply and demand, statistical tables, showing the grading, numbers, average prices, price range for bulk of sales and top prices of all live stock offered for sale, as well as the disposition and comparative receipts during the period.

There is also issued weekly in similar form information of general interest on the live stock and allied industries as regards both domestic and foreign markets. These reports are issued to the press, to agricultural representatives and other officials, and to such individuals as express a desire to receive them. For the information of agricultural, financial and trade journals, a special market report is prepared on the opening market of each week by the stockyards representative and telegraphed to these journals.

The dairy market intelligence service, issued from the Dairy and Cold Storage Commissioner, consists of a weekly market letter, a monthly statement, and a lettergram service. The weekly letter, issued each Monday from early in April until the close of the year, gives the transactions in cheese and butter at the

different auctions and exchanges in Montreal and on country dairy boards during the previous week. Prices of cheese and butter in Toronto and New York for the previous week are also given, as well as values in Toronto and Montreal. Special market letters are issued from time to time as conditions warrant, from January to April. Twice a week the day's prices of cheese and butter at Toronto and Montreal are wired to the different provincial dairy officials, through whose offices the information is distributed within the respective provinces. Collect telegrams or night lettergrams giving the day's prices of either cheese or butter, or both, at Montreal and Toronto, are supplied to anyone requesting them. A monthly dairy newsletter is a compilation of marketing information with respect to dairying throughout the world. It is prepared in multigraph form and is available to anyone who asks for it.

Current prices and supplies of seed, feed and fertilizers on foreign and domestic markets are reported in semi-monthly statements by the Seed Commissioner, and are available on

request. Besides being a guide to buyers and sellers of these products in respect to sources and markets, these reports have a value in directing the public with respect to the grades and quality of the products dealt with both in domestic and export markets.

Market requirements with regard to fruit and vegetables in the United Kingdom and European countries are made known to Canadian growers and shippers through a co-operative arrangement between the Department of Agriculture and the Department of Trade and Commerce. The latter department maintains a fruit trade commissioner overseas, who communicates the results of his observations and study to the Dominion Fruit Commissioner, for dissemination throughout Canada.

Information respecting the condition and quantities of fruit and vegetables arriving daily on the principal markets is collected and published in the market report. This service assists in maintaining an equal and uniform distribution of fruit and vegetable products.

THE INFLUENCE OF FEEDS AND FEEDING ON THE TYPE OF MARKET HOGS

By G. B. ROTHWELL, Dominion Animal Husbandman

THE grading regulation pertaining to market hogs, recently brought into effect, has naturally caused much interest in the bacon-type breeds. Intelligent breeders realize that within breeds of swine, as with other classes of stock, there are strains and families of peculiar merit from the standpoints of type, conformation, and economy and rapidity of gain. There is still

another factor affecting quality and type in the finished market hog—feeds and feeding. Without claiming particular weight of influence for either factor, it may safely be stated that the question of feeds and feeding so closely interwoven with desirable strain that one complement is useless without a consideration of the other, in an analysis of what goes to the making of select market hogs.

The Lack of Direct Experimental Data

In the records of experiments carried on at the Central Experimental Farm at Ottawa and on the Branch Farms and Stations, the objects sought in the past have had mainly to do with economy of gains, from a great number of comparative standpoints, with different breeds, feeds, methods of feeding, methods of housing, pasturing, methods of weaning, etc. Aside from soft pork investigations, very little experimental work has been carried on with the definite aim of ascertaining the effect

His life history is short. Attention or the lack of it to selection and feeding will show itself more rapidly in the general type as evidenced by the individuals of a herd of swine than with any other group of farm animals.

Observations Resulting from Experimental Work

The observations stated here are mainly in reference to feeder or market hogs. Even before this, the feeding of breeding stock should be considered. Sows wintered indoors, fed



A Select Hog.

of feeds and feeding on the quality of the ultimate product. Nevertheless, the importance of these factors has impressed itself very definitely in a practical way.

Undesirable methods of feeding causing unthriftiness or malnutrition at any period will naturally have an indelible effect on the finished product. But more important still, hogs may be reared in thrifty, healthy condition and still be placed under a handicap in the final analysis. The hog is an animal of plastic nature.

little or no roughage, succulent or mineral feeds, consuming mostly grain feeds, and with little opportunity for exercise, have been found to produce weak or small litters lacking in vigour, constitution and bone. Hairless litters are common under such conditions. Such few pigs as come through to the finished stage, aside from the question of profit and loss, are likely to show the effects of an unkind fate. They are too often either short and thick or too shallow and poorly developed generally.

Assuming, however, that the very important detail of care of breeding stock is regularly appreciated in its relation to the production of the right kind of hogs, the feeding of the hog actually destined for market should be considered.

The weaning period and from weaning until twelve to sixteen weeks of age is the critical period in the life of a bacon hog. Three years of work of an experimental nature at the Central Experimental Farm revealed conclusively that: (1) Young pigs fed rations containing a minimum of

and tankage (no milk), while not of the undesirable type of the pigs getting meal only, were, nevertheless, sufficiently checked in growth to cause their development into market pigs too short, too thick and lacking quality. It will be remembered that these conclusions, as referring to tankage, have reference to the use of this product during the weaning period.

Other experiments of somewhat similar nature indicate similar results. The conclusions reached, which bear of little qualification, are:



"Weaners" at the critical stage.

fibre and with skim milk available, thrive well, had little or no setback incidental to weaning and grew the frame and bone that enabled them later to develop into select market hogs; (2) Weanling pigs fed the same ration without milk were much less thrifty, inclined to be stunted, and developed into slower finishing and thicker, shorter hogs ("thick-smooth," to-day); (3) Pigs fed meal mixture plus tankage and milk were, if anything, less thrifty than where no tankage was used, but developed into select hogs; (4) Pigs fed meal

(1) A certain check in growth may be expected at weaning time. The nature and extent of this check has a very great influence on later development.

(2) Supplementing the mother's milk of nursing pigs by easily digested meals with skim milk during the last few weeks effects a gradual change.

(3) In formulating a ration calculated to change as gradually as possible from mother's milk,—and by so doing to reduce to the minimum the weaning checks that so dis-

astrously affect later development—milk is almost a necessity.

(4) The weaning and weaned pig is unable to digest and assimilate

much crude fibre. Middlings and oat meal or sifted oats with skim milk is a standard weaning ration, valuable on account of low fibre content and supplying as it does the elements for rapid growth.

In short, stunted growth in the weanling is usually the result of malnutrition. Later correction is very difficult. The result of improper feeding in the early stages usually holds its influence to the end.

The Effects of Later Feeding

The balance of ration naturally has its effect. Generally speaking, Canadian hog rations have fair balance. Heavily carbonaceous rations apparently have no place in the ration of the hog destined for a select. Lots of hogs of identical type and breeding fed at Ottawa (a) with the grains (corn, oats, shorts, tankage) separated and fed in a self-feeder, and (b) with the same grains mixed by hand, showed that the self-fed hogs selected a ration composed largely of corn (nearly 80 per cent) and finished more rapidly than their hand-fed neighbours. They were classed as typical, thick smooth hogs. The hand-fed lot made slower gains, on a lower grain consumption and graded as selects. One other point: many feeders boast of their ability to finish hogs to market weights in six, five and a half and even five months. These statements are, in many cases, doubtless based on fact, although feeders of live stock frequently have convenient memories and agile imaginative power. In the experience of the Experimental Farm System, it is unwise to strive for too great rapidity of gain, where the disastrous consequences of over-feeding on finished type is ever in the offing. *Any system of feeding a bacon hog that tends toward the too early laying on of fat and prevents the maximum growth of bone and muscle*



The Finished Product.

during the first four months tends toward the development of a thicker, shorter carcass and away from the type that will make into a lean or leanest side.

The Effect of the Self-Feeder

The above statements have been borne out by several years of experimental work with self-feeders at Ottawa. With hogs of identical type and breeding, these results have been noted: (1) That hand-fed hogs develop more slowly, consume slightly less meal per pound of gain as compared with self-fed lots and finish as select hogs; (2) That self-fed lots finish in less time than the former but are, on the average, a little more fat and thick, particularly in the shoulders. Where such lots (self-fed) received milk, they would grade as selects on a lenient grading. Where self-fed lots received no milk, the tendency has been to finish hogs more of the thick type. Forced or unlimited feeding, particularly during the early stages, undoubtedly has its effect on type at finish.

The Effect of Exercise and Outdoor Life

To grow bone and muscle and to promote proper functioning, exercise has been found absolutely essential up to at least ten to twelve weeks. After that, hogs of the right type at finish can be fed indoors with only small yards for exercise with green feed and mineral matter supplied. In fact, the question of pasture versus soiling for the market hog is still one of contention. Exposure to sun and weather has a marked and lasting effect upon quality. Severe sun-burn causes a check in growth with the consequent shortening up or thickening effect on the hog. Pasturing has given excellent results insofar as finished type has been concerned, where the hogs were 3½ to 4 months old before pastured and where either natural shade was available or the hogs were of a colour better able to withstand

the effect of sun than in the case of the white-skinned hog. Given the choice of placing young pigs on shadeless, even though otherwise excellent pasture, or, on the other hand, in some form of cheap pen accommodation providing shade, relative coolness and the provision for regular supply of green food to these pigs in small racks, and the conclusions at Ottawa after many years' observation have all been in favour of inside feeding in cheap quarters. Trying to force a young, white-skinned pig to consume crude fibre that his system was not ready for, under a June and July sun, has almost invariably left a mark on quality of finish.

The Effect of Housing

Much might be written on the effect of proper housing. Repeated experiments have been carried on in types of winter accommodation. Late summer pigs have been wintered in comfortable heated pens. The main difficulty encountered was that of crippling, with a decided effect on finished type. Generally, inside-fed pigs in winter tended, if anything, toward lack of length and scale. Hogs fed in semi-outdoor conditions (partly open sheds supplied with low enclosed sleeping quarters, opening on small yards) finished into select hogs in practically every instance, with no sign of crippling.

The Effect of Minerals

The effect on type of withholding mineral supplements in the case of winter fed hogs has been marked. Access to charcoal, soft coal, earth, lime, bone meal, etc., has noticeably increased scale, length, development of bone. More particularly still has been the desirable effect noted in the proper mineral rationing of breeding stock. Pregnant sows with access to a variety of minerals, will produce, other things being equal, pigs of the right type at birth.

The Effect of Milk Products

To the last has been left this most important of all considerations in this connection. Limiting these remarks purely to effect on type and aside from economy of production, it may be said briefly that, insofar as the Dominion Experimental Farms are concerned, on farms where milk products are available, the raising of select bacon hogs is the rule. Where milk products are scarce or lacking, the quality, thrift and vigour of young pigs is comparatively adversely

There may be partial replacers. There is the possibility that, in the near future, a commercial milk powder may be placed on the market at a price within reach of the swine-raiser who has no milk by-product to feed. At the present time, nevertheless, in the light of all evidence, it is apparent that commercial hogs can be raised without milk. Greater skill, however, is required in feeding. The probability of lowered quality at the finish must be considered with our grading regulations. The feeder with milk at his disposal has the



Bacon type ancestry and milk products practically insure the production of select market hogs.

affected with the consequent effect on type of finish.

In the writer's mind, the fact that there is a comparatively small percentage of select hogs coming to our yards, particularly in the West, is due, in no small measure, to lack or insufficient quantity of milk and abrupt weaning methods. Experiments on the Experimental Farm System have shown that with our Canadian grain rations, there is no full substitute for milk products.

safest, most productive and surest feed during the feeding period and the one feed of all that, other things being equal, practically insures type at finish.

A high priced gun of correct type and reputable manufacture does not necessarily obtain a high average score at the range or trap. The explosive must be right, also the ammunition, and, lastly, the man who holds the gun. The case of the bacon hog is not so very different.

EXPERIMENTS IN TOBACCO CULTURE

I. THE DOMINION TOBACCO STATION, HARROW, ONTARIO

By D. D. DIGGES, Superintendent

THE Harrow Tobacco Station, located near Harrow in Essex county, Ontario, is devoted primarily to research and experimental work with two distinct types of tobacco, namely—White Burley, an air-cured type, and the flue-cured types.

The Burley, or air-cured type, is used largely as a plug-chewing and plug and granulated pipe tobacco.

Essex and Kent counties are the chief producing districts for Burley;

usually some two and one-half million pounds.

On the Harrow Tobacco Station, experiments are being conducted in practically every phase of the culture of the above-mentioned types of tobacco which can be of interest or of practical value to the tobacco grower.

That the experiments being conducted and the results obtained are not only appreciated but are exerting a marked influence throughout the



Harrow Tobacco Station: Seed heads of White Burley Tobacco bagged to prevent cross fertilization.

however, other counties along the lake shore can and do produce it also, the annual production varying from four to twenty million pounds, with the average annual output approximately eight million pounds.

The flue-cured types are extensively used as cigarette and granulated smoking tobacco and, as such, are steadily increasing in favour.

Essex county is the chief producer of the flue-cured types, growing an-

tobacco-growing districts, is proved by the interest shown by the growers, and by the rapid improvement in cultural methods and the consequent improvement in the quality of the tobacco produced during the past few years.

As late as 1917, sterilization of tobacco seed beds was exceptional; the use of foreign-grown seed of uncertain origin and of unknown, and frequently impure, strains was univer-

sal; the growing of tobacco seed was very exceptional; the cleaning of seed unknown; the use of insecticides was exceptional; failure in the production of early, thrifty seedlings was very common; the selection of the proper variety for the various types of soil haphazard; the use of chemical fertilizers was very limited and the method of application received but little consideration; very little attention was paid to quality, the yield being the chief, and frequently the only, consideration; and, in fact, in the majority of cases, the cultural methods were haphazard throughout

bed and plants an acre or more). The use of insecticides in controlling pests is almost universal. Failures in the production of thrifty early seedlings have been greatly reduced; while the varieties to be grown are carefully selected. The use of chemical fertilizers has become almost universal, some growers mixing their own, and the users striving to understand the art of fertilizing most advantageously and demanding information regarding analysis, quantity to be used and method of application. Further, there is a realization of the value of quality—an honest effort being ap-



Curing barn and kilns; Harrow Tobacco Station.

and the element of luck was largely blamed or praised for the results obtained.

During the past few years, in direct contrast to the above-mentioned state of affairs, one finds the sterilization of tobacco beds with steam to be universal. The demand for acclimated, cleaned seed of known variety and purity is now so great as frequently to exhaust the stock of one hundred pounds grown annually on the Harrow Station, in addition to large quantities produced by local growers (one-seventh of an ounce of seed seeds 100 square feet of tobacco

parent on the part of the majority of the growers to produce quality as well as quantity—and finally there is a general improvement in cultural methods from transplanting to the marketing of the crop.

It is believed that the work done at the Harrow Station has been a help to the grower in his effort to improve the quality and quantity of his tobacco crop. Some of the main results of the Station's experimental work are:—

It has been proved that sterilization of the tobacco seed beds with steam not only eradicates weeds and

diseases but also results in the production of earlier and more thrifty seedlings.

It has been proved that the glass covered, semi-hot bed will produce plants as early as will the greenhouse, and that it frequently produces more robust plants than will the greenhouse.

The best distances for transplanting the various varieties for both yield and quality have been determined.

The use of chemical fertilizers has been shown to be very profitable, the net return from their use during the past seven years ranging from 126 per cent to 870 per cent.

The best method of applying the fertilizer has been determined, and the best analysis and quantity to be used on different soils and for various varieties have been studied and satisfactory formulae determined.

The best varieties of tobacco for various soils and conditions have been determined.

It has been proved that acclimated seed gives earlier seedlings and plants that not only ripen earlier but more uniformly. Large quantities of seed of the varieties common to the district are grown annually for distribution.

The most effective time for manuring and ploughing the soil for tobacco has been determined.

The best rotations to be followed in tobacco culture have been ascertained.

The most economical and effective insecticide has been found, as well as the proper rate, form and method of application.

Fungicides for the control of diseases have been tested.

The most economical methods of harvesting and curing have been determined, as well as the effect of various methods on the quality of the cured product.

In addition to the above-mentioned work, valuable information has been obtained on many other phases of tobacco culture.

During the past season, in an endeavour to solve the fuel problem for the growers of flue-cured tobacco, a problem which is most vital and constantly becoming more acute, the Harrow Tobacco Station tested out the curing of tobacco with steam heat. Although this was decidedly a new departure, in an untouched field, it was proved conclusively that tobacco could be flue-cured economically and satisfactorily in this manner. While the experiment met with the approbation of all of the growers and while some of them have already purchased boilers and announced their intention of employing steam on a commercial basis, it is too early to estimate the possible value of this experiment. However, with fuel rapidly becoming scarcer and more expensive it may prove to be the only solution for a large number of tobacco growers.

II. THE FARNHAM TOBACCO STATION

By J. E. MONTREUIL, Superintendent

AN experimental field for the growing of tobacco was established by the Dominion Tobacco Division at St. Césaire de Rouville, Que., as early as 1908, but it was only in 1912 that the Farnham Experimental Station was established.

This Station, although handicapped by the war, and, as yet, comparatively young, has had nevertheless a very great influence on the progress and improvement of tobacco-growing in the Province of Quebec, and particularly in those counties through

which the Yamaska river flows. As a matter of fact, the progress noted in tobacco-growing in the counties of Rouville, Iberville and Missisquoi, followed the establishment of this Station. Since its inception, the Station advised growers to limit the number of varieties grown; but it is specially in popularizing those varieties for which there is a demand among the manufacturers, and in convincing the latter of the merits of the Canadian leaf, that it has contributed to the progress of the tobacco industry in the district to the south of Montreal.

Although tobacco was grown in the Yamaska valley for many years before 1912, there was no regular market for the varieties, as these had been chosen particularly for their large yields, and the crop of pipe tobaccos (sold in leaf form) had almost reached the point of overproduction.

By encouraging the growing of the binder types for cigars, the station opened a new outlet, and the growers could then increase the areas of their plantations.

By careful selection, the ordinary Comstock, which usually came from seed imported from the United States, was improved to such an extent that one might believe it to be a new variety. Mr. Chevalier makes the following statement in regard to this variety: "By dint of systematic selection, we have maintained the thinness and large size of the Comstock, while replacing its rather pointed leaf by one that is comparatively oval-shaped."

While the shape of the leaf was being improved, the yield of the crop was increased. In 1908, the average yield for Comstocks was 1,000 to 1,200 pounds; our present Comstocks give us, on land of average fertility, a mean yield of 1,400-1,500 pounds per arpent, an increase of at least 200 to 300 pounds. At the Farnham Station, where the land is only of

moderate fertility, the average yield for 1920, 1921, 1922, was 1,584 pounds per arpent, or 2,156 pounds per acre.

A survey of the Yamaska valley plantations would show that at least 75 per cent of the binder tobaccos grown are of the Comstock variety, improved by the Tobacco Division of the Central Experimental Farm and the Farnham Station. Also that estimating the yearly crop at 2,000,000 pounds, and the average price at 15 cents per pound—a figure that is undoubtedly below the average price of the last ten years—it will be seen that the improved Comstock brings to the growers of Missisquoi, Iberville and Rouville counties, a yearly increased return estimated, at the very lowest, at between \$40,000 and \$50,000.

But the work of the Farnham Station has not been limited to the improvement of Comstock. By means of selection and cross-breeding, the type of several varieties has been improved and fixed and new hybrids have been originated, one of which, the Yamaska, seems to be very promising. This new creation yields almost as much as the Comstock, its leaves are elastic, fairly straight, and thinner than those of the Comstock; in fact, its leaves are often so thin and their veins so delicate that they can be used to make wrappers of fairly good quality. There is an objection to the Yamaska variety; it is very brittle and requires to be handled with the utmost care by expert workers. This is a defect, however, that might be remedied.

While the work of originating new varieties to meet the requirements of the cigar industry was going on, the methods of growing tobacco were also improved. In perfecting the making of semi-hotbeds without manure and bringing about their use an important advance was made. Hotbeds are always hard to construct

and operate properly; semi-hotbeds without manure, recommended by the Farnham Station, cost less, their construction and maintenance are easier, they are less subject to be invaded by diseases, they produce good, healthy plants, which do not suffer from transplanting and are less inclined to spindle than those grown in hotbeds.

Tobacco plants are attacked by several insects and diseases. By popularizing the use of poisoned bran and spraying with arsenate of lead, and by demonstrating the advantages of disinfecting the mould for the seed bed with formalin or sterilizing it by steam, much has been done to insure the success of tobacco growing.

The majority of the growers buy their manure in Montreal. This manure, however, is in great demand by vegetable gardeners and commands too high a price to-day to be used economically in tobacco growing. There is also another disadvantage: the growers cannot always get a sufficient quantity of it. Moreover, as the composition of manure cannot be changed, and as the quality of tobacco is easily affected by the quality of the manure, it would often be better to use less manure and to supplement it by the application of the necessary quantities of chemical fertilizers.

The first thing to do is to find the maximum formula of chemical fertilizers to use for the type of tobacco grown and the soil it is grown on. This is what the Farnham Station has been endeavouring to do by repeated experiments on thirty plots during the last four years. The soils

of the Yamaska valley are losing their lime, a loss which is general throughout the province. Tobacco does not succeed on acid soils; but, on the other hand, an ill-advised application of lime would be followed by a deterioration in the suppleness and elasticity of the leaf. Over ten plots were used specially for the study of liming of tobacco soils.

The market for binder tobaccos is limited, and soon it will be necessary for our growers to seek new markets, if they go on increasing the number and the area of their tobacco fields. At the present time, the Province of Quebec produces practically no aromatic tobaccos (fillers) for cigars. The acclimatized varieties that might be used for the purpose do not yield enough to remunerate the grower; on the other hand, the large-yielding varieties which we have tried so far to acclimatize lose practically all their aroma. Two or three acclimatized varieties of Cuban, selected by the Tobacco Division and grown at the Farnham Station, give promise of keeping their aroma while retaining the qualities necessary to make good fillers. If we can manage to have the Canadian fillers accepted by the manufacturers, were it only for cheap cigars in the beginning, a market for two million more pounds of tobacco would be assured.

It would be impossible, in the space allotted to this article, to describe all the problems studied by the Farnham Station and show their importance. There are also many problems requiring careful study which have not yet been touched. These we hope soon to undertake with the co-operation of the growers of the district.

POTATO INSPECTION AND CERTIFICATION IN CANADA, 1922

By GEO. PARTRIDGE, Division of Botany

DURING the year 1922 the work of potato inspection and certification progressed along lines similar to those of previous years, a noticeable feature being a largely increased number of applications for inspection, with a consequent increase in the number of fields and acres inspected. Another noticeable feature has been an increased demand for our certified seed potatoes by growers in the United States. This is taken as an indication that Canadian-grown seed potatoes which measure up to the standards and are certified by inspectors of the Division of Botany, Experimental Farms Branch, Dominion Department of Agriculture, as to freedom from disease, varietal purity and trueness to type, have acquired a favourable reputation in many of the great potato growing districts to the south.

The Dominion system of inspection is carried on in all the provinces of Canada, with the exception of British Columbia, which maintains a provincial service conforming, however, to Dominion standards. During the past year, 3,283 fields, containing 11,250 acres, were inspected, and of these, 1,732 fields, containing 6,642½ acres, passed both field inspections; an average of 52.8 and 59.0 respectively. The average amount of disease present in the fields which were accepted for certification, subject to tuber inspection, was: Blackleg .47 per cent, Leaf Roll .65 per cent, Mosaic 1.06 per cent, Wilts .14 per cent. Tuber inspection of the crops from accepted fields is still in progress; up to the present date (December 21) 379,355 bushels have been certified.

Owing to the vastness of the area covered by this work, the attainment and maintenance of uniformity of methods has been one of our chief

problems in the formulation of standards. It has been found necessary in past years to revise and adjust such standards, but, as a result of experience gained, definite and permanent standards have now been decided upon, and, commencing with next season, will be applied.

These, while not greatly varying from those previously applied, make provision for the combination of Leaf Roll, Curly Dwarf, Crinkle, Spindling Sprout and Streak, under the head of Leaf Roll, with a combined tolerance of six per cent; the proposed field inspection standard being as follows:—

Blackleg 3 per cent.

Leaf Roll 2 per cent.

(Curly Dwarf, etc.)

Mosaic 2 per cent.

Wilts 3 per cent.

Providing that in no case shall a total of more than six per cent be allowed.

At the time of the first field inspection it is usually found possible to determine the cause of "misses" in a field. When blackleg is found to be the cause, and the misses are numerous, the field is disqualified. When an inefficient planter is found to be the cause, and the field is otherwise up to standard, the grower is advised, in his own interest, to see that such a planter is put into proper shape.

There are also instances where unfavourable soil or climatic conditions are responsible for misses, the sets being suffocated or the sprouts unable to break through the surface; but as such conditions usually have the effect of rendering the whole field unhealthy in appearance and of sapping the vitality of the crop, the field cannot of course be accepted for certifi-

cation, however free from conditions produced by disease it may otherwise be.

For some years a column was contained in the field inspection reports for recording "Weak Plants." It was found, however, that this provided the inspectors with a weapon which was too obviously encouraging merely superficial inspection, the "Weak Plants" column being in some instances used far too freely. Some definite disease, or other condition, is responsible for weak plants, and it is important that such conditions be ascertained. The column in question was therefore eliminated.

The limit of tolerance of foreign varieties is one per cent, allowing, of course, in the event of the presence of a larger percentage, the grower to rogue his field, should he be willing to do so, between the first and second inspections.

Late Blight, Early Blight, Tip Burn and Insect Injury, are recorded in the field inspection report under the headings "Slight, Moderate and Severe." Since, generally speaking, these troubles may be kept from becoming severe by the frequent use of fungicides and insecticides, and since, in the case of the three latter troubles, a severe attack obviously affects the vitality of the crop—a severe attack of Late Blight being still more disastrous—any field severely affected by these troubles, and so listed in the field inspection report, is rejected.

A rather troublesome question which arises in connection with the maintenance of uniform field inspection standards is, "What importance should be attached to Rhizoctonia?" This trouble appears to be everywhere; in some parts to a negligible extent only, in other parts it is so severe in some years—as in Manitoba, parts of Saskatchewan and Alberta during the past year—that

its effect upon the crop cannot be disregarded. Adjustment can of course be made in the application of the tuber inspection standards, in which ten per cent is allowed, but the crops from some of the fields referred to have been affected from 80 per cent to 100 per cent, which was a foregone conclusion, considering the conditions observed in these fields.

This trouble does not appear to be subject to control by seed treatment, particularly in the localities referred to. It would therefore seem to be of importance that investigation of Rhizoctonia should be made from other standpoints, such as soil, temperature, date of planting, date of digging, etc. In 1921 some evidence was obtained by Mr. Herbert Groh, of the Division of Botany, who was for some time acting as supervisor of potato inspection in Manitoba, which indicated that a low percentage of Rhizoctonia on the tubers was associated with immaturity of crop. This evidence was later supported by data secured through the courtesy of Dr. Bisby, at the Manitoba Agricultural College, from a series of tuber treatment experiments. Potatoes dug at successive dates, showed consistent increase of black scurf with each digging until the sixth, the seventh remaining practically the same at a figure so high as to leave little room for further increase.

Some attention has been paid during the past year, particularly in Nova Scotia, to isolation. Although no definite project has been worked out for the establishment of permanent isolation, fields of potatoes of the Garnet Chili variety—which variety is grown almost exclusively for shipment to Bermuda—will probably not be accepted next year for certification unless an attempt at isolation is in evidence.

During the past three or four years some valuable work has also

been done along this line by Mr. G. C. Cunningham, Plant Pathologist-in-Charge, at the laboratory at Fredericton, N.B., who has also acted as supervisor of inspection in that province. After several years' testing and experimental work, as a result of which he became convinced of the value of some specially selected strains of Green Mountains and Irish Cobblers, Mr. Cunningham was responsible for the multiplication of these strains and their general introduction into several important potato growing districts in New Brunswick. To-day these districts are practically community seed centres and are fast establishing a reputation for the excellence of the seed produced by them, to say nothing of the establishment of a profitable business.

Many districts of Prince Edward Island are also working towards community seed centres. With the introduction, some years ago, of some good strains of Irish Cobbler and Green Mountain potatoes into that province—where formerly potatoes of white variety were not grown to any extent—there came a revolution in seed potato growing. To-day, as the result of careful multiplication of the strains introduced, a large and ever-increasing supply of high-class seed of these two varieties is being produced, 89 per cent of which has this year measured up to the inspection standards. The attainment of these excellent results is aided and encouraged under the enthusiastic auspices of the Prince Edward Island Potato Growers' Association, which is very proud—and rightly so—of the progress made.

The following are the standards for tuber inspection:—

	Per Cent.
Bacterial Rot or Wilt.. . . .	2
Late Blight and Dry Rot. . .	3
Common Scab and Rhizoctonia severe.. . . .	5
Powdery Scab.. . . .	1

Providing that in no case shall a total of more than 10 per cent be allowed.

Not more than two per cent of the tubers shall be off type or damaged by sunburn, cuts, cracks, bruises, insects, etc.

No tubers injured by frost shall be allowed.

Not more than five per cent by weight of the tubers shall be below three ounces or above twelve ounces.

The headquarters of the inspection service are at the Central Experimental Farm, Ottawa. The service is under the direction of The Dominion Botanist, Mr. H. T. Güssow, with the writer in immediate charge. It was organized by the Dominion Botanist in 1915 on a small scale in Prince Edward Island and New Brunswick, and rapidly expanded until—as stated above—at the present time it is carried on in all the provinces from Prince Edward Island to Alberta.

It is now organized by provinces, with a supervisor in each province, responsible to headquarters for the work of the number of permanent and temporary inspectors necessary to carry on the work to the best advantage. The supervisors in charge of the work in the various provinces are as follows:—

Province	Name	Headquarters
Prince Edward Island.. . . .	S. G. Peppin.. . . .	Charlottetown
Nova Scotia.. . . .	W. K. McCulloch.. . . .	Truro
New Brunswick.. . . .	G. C. Cunningham (acting).. . . .	Fredericton
Quebec.. . . .	B. Baribeau.. . . .	Ste. Anne de la Pocatière
Ontario.. . . .	J. Tucker.. . . .	St. Catharines
Manitoba.. . . .	Vacant.. . . .	Winnipeg
Saskatchewan.. . . .	J. W. Scannell.. . . .	Saskatoon
Alberta.. . . .	H. S. MacLeod.. . . .	Saskatoon

PART II

Provincial Departments of Agriculture

THE ROYAL AGRICULTURAL WINTER FAIR, 1922

By R. W. WADE, Director, Live Stock Branch, Ontario Department of Agriculture

THE first Royal Agricultural Winter Fair was held in the new Coliseum, Exhibition Park, Toronto, from November 22 to 29, 1922. The exhibits were from every Province of the Dominion and from nine States of the American Union.

The following were the officers: President, W. A. Dryden, Brooklin; Vice-President, E. M. Carroll, Carls-Rite Hotel, Toronto; General Manager; A. P. Westervelt, York Building, Toronto. Executive Committee: J. D. Brien, Ridgetown; D. O. Bull, Brampton; F. C. Fletcher, Union Stock Yards, Toronto; Lt.-Col. Robt. McEwen, R.R. No. 4, London; E. H. Stonehouse, Weston.

The attendance amounted to 140,000 for the seven days. A complete

analysis we believe would show that it was on an ascending scale, as the popularity of the Show seemed to increase from day to day, so that during the last few days, the arena, one of the largest in America, was hardly able to hold the visitors.

There have been many shows held on the American Continent, from speciality shows to world's fairs. It has, however, remained for this last new show to demonstrate what can be done when all factors for success are present, namely: accommodation for staging a show; a complete and generous prize list; active and efficient management; enthusiastic and progressive patrons and exhibitors.

The following table shows not only the diversity and range of the exhibits, but also the record number in most of the classes:—

TABLE SHOWING ENTRIES, BY PROVINCES AND FROM THE UNITED STATES IN THE VARIOUS DEPARTMENTS OF THE ROYAL WINTER FAIR

	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.	U.S.A.	Total
Horse Show.....				37	978	18				146	1,179
Breeding Horses.....				31	342	30	30			15	448
Beef Cattle.....				27	375	13		37		204	656
Market Cattle.....		1			123	5		20		25	174
Dairy Cattle.....	70	141		367	697		12			93	1,380
Milking Test.....	11	7		27	76					8	129
Clean Milk.....	3	1		4	11					1	20
Sheep and Wool.....					732		15			38	785
Swine.....				13	560		9			18	600
Foxes.....	325	4	16	43	52					4	444
Seeds and Potatoes.....	5	2	23	17	205		1	3			256
Poultry and Pet Stock.....			3	214	8,802	4	13		32	32	9,100
Dairy Products.....		6	4	7	340	26	10	29			422
Vegetables.....			3		449						452
Fruit.....	7	5	52	7	609				125		805
Flowers.....					107						107
Gold Fish.....					22						22
	421	167	101	794	14,480	96	90	89	157	584	16,979

THE AGRICULTURAL GAZETTE OF CANADA

The following table shows the comparative number of entries in the different departments at the leading shows and exhibitions:—

	Royal Agricultural Winter Fair, 1922	Canadian National Exhibition, 1921	Ontario Provincial Winter Fair, Guelph	International Exposition, Chicago, 1922	National Dairy Show, St. Paul, 1922	New York Horse Show, 1921	World's Fair, St. Louis, 1904	Panama-Pacific, 1915	Madison Square, N.Y., 1923	Boston, 1921	Royal
Poultry.....	9,100	6,154	6,666	.....	.....	.....	10,000	7,249	4,122	5,074	2
Dairy Cattle.....	1,380	632	146	.....	826	.....	.....	.....	.....	.....	1
Light Horses.....	1,311	153	141	?	.....	1,617	.....	.....	.....	.....	2
Heavy Horses.....	316	205	257	731	.....	.....	.....	.....	.....	.....	2
Beef Cattle.....	830	613	387	2,305	.....	.....	.....	.....	.....	.....	2
Sheep.....	785	699	809	1,339	.....	.....	.....	.....	.....	.....	3
Swine.....	600	552	341	1,553	.....	.....	.....	.....	.....	.....	2
Student judging.....	221	318	264	100	.....	.....	.....	.....	.....	.....	3
Grain and Seeds.....	256	226	394	?	.....	.....	.....	.....	.....	.....	2
Dairy Test.....	149	.....	90	.....	.....	.....	.....	.....	.....	.....	1
Dairy Products..	422	272	.....	.....	.....	.....	.....	.....	.....	.....	1
Foxes.....	444	.....	14	.....	.....	.....	.....	.....	.....	.....	1
Vegetables.....	452	357	.....	.....	.....	.....	.....	.....	.....	.....	1
Fruit.....	805	846	.....	.....	.....	.....	.....	.....	.....	.....	2
Flowers.....	107	208	.....	.....	.....	.....	.....	.....	.....	.....	2

NOTE:—We were unable to secure definite figures on the number of entries under Light Horses, and Grain and Seeds, at the International Exposition, Chicago.

In glancing over the above table it will be noted that the Royal Show takes a commanding position in comparison with other shows of this continent, standing first in a large number of the sections, second in the remaining sections—with the exception of two cases where it is third to Chicago and Guelph in the number of sheep—and third to the Canadian National Exhibition and Guelph in the number of students judging. It has the proud distinction of having had more dairy cattle than the National Dairy Show, St. Paul:—

	National Dairy Show	Royal
Jerseys.....	128	210
Ayrshires.....	116	528
Brown Swiss.....	121	70
Guernseys.....	163	176
Holsteins.....	298	353
French Canadian ..	...	43
Total.....	826	1,380

In poultry there were more exhibits than at any of the great poultry shows of this continent, with the exception of the World's Fair, St. Louis, in 1904. It stood, as a light horse show, second only in numbers

to the New York Horse Show, with eighty per cent of the entries of the New York show. It was second to the International Exposition, Chicago, in Heavy Horses, Beef Cattle, Sheep and Swine. It should be borne in mind, however, that The Royal not only included the classes in which Chicago excels, but also had a record poultry show, an outstanding light horse show, and the largest dairy cattle show ever staged on this

building, the tasteful decorations, the visitors in the galleries, sometimes to the number of 8,000, the excellent lighting effects in the evening, and the general harmony of colour, cannot be shown in a picture, but have to be seen to be appreciated.

As an exhibition the first Royal Show has been highly successful. It has been one of the least costly and most effective means of advertising the agricultural development



Judging Aged Ayrshire Cows in Milk at the Royal Agricultural Winter Fair.

continent, as well as including a number of agricultural and horticultural displays, thus making it a very comprehensive exhibition.

One section should perhaps receive special notice, and that is the notable display of Black and Silver-Grey Foxes, exhibited from five of the nine Provinces, and a few from the United States.

The illustration showing the Ayrshire Cows being judged, will give some idea of the general appearance of the arena. It does not do it justice, however, as the proportions of the

of the Dominion, and should prove a great inspiration to all people connected with the great industry of Agriculture. It received the heartiest support from farmers and stockmen; the closest co-operation from the various Departments of Agriculture, both Provincial and Dominion. With these factors working for the show in the future, it would appear to be an easy thing to prophesy a long, continued and successful career to the Royal Agricultural Winter Fair Association of Canada.

THE TEACHING OF AGRICULTURE AND DOMESTIC SCIENCE IN QUEBEC

By A. DESILETS, B.S.A., of the Quebec Department of Agriculture

I. THE BETTER FARMING TRAIN OF 1922

THE better farming train, organized by the Quebec Department of Agriculture and the Canadian Pacific Railway, started on its tour of the province of Quebec on September 18, 1922. It included sixteen cars of agricultural products, coming from the various districts of the province. The exhibits were placed in the following order:

(1) Grading of hogs; (2) Animals typical of the various breeds; (3)

and management; (16) Miscellaneous advice and housing.

One of the objects in view in arranging for this train was that the Hon. J. E. Caron, provincial Minister of Agriculture, wanted to bring before the general public, in town and country alike, conclusive proof of the fact that the products of our land, of our herds and flocks, as well as of our home industries—due to the scientific methods taught by the various



The Agricultural Train in Quebec drew crowds of interested visitors at each stopping place.

Feeding of live stock; (4) Dairy sires and bacon hogs; (5) Milch cows; (6) Live Stock judging; (7) Sheep and swine; (8) The dairying industry and co-operation; (9) Field crops; (10) Rural engineering and farm buildings; (11) Horticulture and fruit trees; (12) Poultry-keeping; (13) Bee-keeping and maple sugar; (14) Home industries; (15) Administration

branches of the Department—are fully equal to the products of other provinces, and even superior in some instances.

Practical lessons were given each day, starting at 10 a.m. and finishing at 10 p.m., by twenty experts on agriculture and domestic science. This train made thirty-nine stops on the Canadian Pacific Railway lines in

the province, and the total attendance was over 145,600.

A similar train had been run on the Intercolonial railway in 1911-12; the attendance at that time was about 16 per cent of that of 1922. This increase is a striking proof of the progress made by agriculture in the province of Quebec during the last ten years.

II. Courses in Agriculture and Domestic Science 1923

The short courses inaugurated in 1915 are held each year during three or four months of the season. This year, the districts of Chicoutimi, lake St-Jean, Charlevoix and Montmorency will be covered by some eighteen instructors. Three sessions will be held each day in thirty-six localities by these travelling colleges, fully equipped with demonstration material and three moving-picture machines.

Notwithstanding unusual difficulties this season, the average attendance at these courses was over 400.

Each year, before starting on these series of courses, the instructors make a thorough survey of local agricultural conditions, noting the possibilities of development or of the establishment of new industries. This opportunity of securing information is welcomed by the farmers, who are always ready to discuss their many problems with these agricultural missionaries, who place their knowledge at the farmers' disposal.

III. Women's Organizations

The women's organizations are certainly one of the most efficient factors in the agricultural progress of the province. If the mother of the family can be made to love her home, the land, it may be taken for granted

that the husband and the children will be faithful to agriculture. The women's clubs and the women's institutes, of which there are 114 at present, count more than 7,000 members receiving technical instruction from the Quebec Department of Agriculture. Such clubs, by study and practical work, develop horticulture, bee-keeping, poultry-keeping, and reestablish domestic textile industries of linens and woollens. They also adopt our methods of agricultural and home book-keeping and encourage the use of the same in their districts. Such organizations help to complete, in a rational and efficient manner, the information given to the students of our domestic science schools.

Agriculture and domestic science in these clubs are taught by seven instructors—of whom five are women—who visit the clubs by turn and regularly. By means of demonstrations and special courses, the instructors teach the knowledge necessary to the mistress of the house in maintaining a proper equilibrium between the production of food and its consumption.

The instructors show how gardening may be made to pay, as well as bee-keeping and poultry-keeping. All the clubs are now using the spinning-wheel and the loom, and the many exhibits at the annual fairs are convincing evidence of the enthusiasm with which the French-Canadian women have resumed the making of linens, cloth, woollens, carpets, laces, etc., for which they were justly famous in the past. Our women apply themselves in an assiduous manner to the rational and economical management of their homes and to the moral and physical training of their children.

THE AGRICULTURAL INSTRUCTION ACT AND ITS EFFECT ON RURAL CITIZENSHIP IN MANITOBA

By S. T. NEWTON, Superintendent Extension Service

POSSIBLY no single act of parliament has had a greater influence on rural citizenship in Manitoba than the Agricultural Instruction Act.

In Manitoba it was assumed that the purpose of the Act was to provide for people living in the country, whose business did not permit them to attend an agricultural college for any considerable length of time, some of the instruction provided at the college. In order to carry on the work with a maximum efficiency and a minimum of expense, the Agricultural Extension Service was organized.

As far as possible, existing organizations were made use of as the connecting link between the Department of Agriculture, the Agricultural College, and the Experimental Farms, on the one hand, and the people living in the country, on the other. The Agricultural Society was already in existence, and has always been ready to co-operate in any line of effort tending toward the improvement of rural conditions, but for women's work there was no organization, and one of the first steps taken was to organize Home Economics Societies, later known as Women's Institutes. Shortly after came the organization of Grain Growers' locals, and later United Farm Women's locals, and these organizations have also shown a very friendly spirit of co-operation. Boys' and Girls' Clubs in connection with the public schools were organized for the purpose of carrying on junior extension work. At the present time we have 70 Agricultural Societies, 140 Women's Institutes, 420 U.F.M., 97 U.F.W.M. organizations, and 215 Boys' and Girls' Clubs with over 1,700 branches.

Extension Work for Men

During the ten years that the Act has been in operation, over 200 short courses, ranging from five to ten days in length, have been held with a total enrolment of over 8,000; and 1,520 community meetings with an attendance of over 114,000. Seventy per cent of the community meetings were held in the newer settled districts and in the new-Canadian settlements, and visits paid to these districts by lecturers in succeeding years gave ample evidence that the information given, and the numerous questions answered by the lecturers had been of great benefit in the improvement of farming methods.

Extension Work for Women

The short courses in clothing work and the lecture demonstrations in foods have been continued from 1915 until the present without any apparent lack of interest. As a general rule, the short courses in clothing have continued over a period of four and one-half days, and the total number of courses held was 1,850, with a total enrolment of 25,900 and an aggregate attendance of 256,000, which means that over 300,000 garments or hats were made, and the instructors, who have been with the Extension Service during the greater part of that time, assure us that the same kind of garment only requires half as long to make now as it took when the short courses were first organized. Not the least of the benefits of the short course was the bringing together of a number of women, who, after working together for a week, get to know each other better and to appreciate each other's good qualities more. In

foods the instruction given during the earlier years that the Act was in operation consisted of demonstration lectures on the preparation of the various kinds of food, and the canning of vegetables, fruit and meats. More recently the tendency has been to emphasize food values.

Throughout the entire period assistance was given in organizing Women's Institutes and in assisting them to prepare yearly programmes. Altogether, over 600 lectures or addresses were given and the aggregate attendance was close to 30,000.

Boys' and Girls' Clubs

As the purpose of extension work was to provide a programme for the whole family, the boys and girls were not forgotten. At the beginning a few independent clubs were organized, but it was soon found that in order to prevent duplication of effort the best plan was to co-operate with the school inspectors and teachers, and this plan has continued to be very satisfactory, both from the standpoint of the Department of Agriculture and the Department of Education, and what is of much more importance, to the boys and girls themselves. Club work has extended even to the schools located at the outposts of settlement, and at the present time over 1,700 schools are connected with the boys' and girls' club organization, and the 205 central club fairs at which are exhibited the live stock, chickens, vegetables, grain, needlework, cookery, canning, school work, etc., are each the big community event of the season and have induced hundreds of thousands of boys and girls to take a keener interest in home and farm life. "Hundreds of thousands" is used advisedly for the membership in clubs ranged from 750 in 1913 to 35,000 in 1922.

Through demonstration team work, some splendid oratorical ability has

been developed, and it is not unusual to find a "teen-age" girl get up on a public platform and give a more finished demonstration lecture than was possible for a grown-up ten years ago.

Through the co-operation of several commercial organizations, over 1,000 boys and girls have been given a trip to Winnipeg, and with it a week of instruction, sight-seeing and entertainment, which has served not only to widen their vision but to bring city and country closer together in understanding and appreciation.

The boys' and girls' clubs supplement the work of the Agricultural and Horticultural Societies in an admirable manner, for whereas these societies have as their principal object the improvement of live stock and the products of the field, garden and kitchen, the clubs have as their chief aim the development of industrious, ambitious boys and girls who are feeding live stock and chickens, raising grains and vegetables, making garments, bread and butter, etc., because they love this kind of work and are incidentally learning better methods and practices in Agriculture and Homemaking.

The motion picture machine, with instructive films on Agriculture and Home Economics, has pushed back 45 miles from the railroads to the great delight of hundreds who had never seen a "movie." Lectures on agriculture and pictures alternated at the meetings and seemed to be received with equal appreciation and enthusiasm.

Beekeeping

Another phase of extension work which has shown great development is the bee-keeping industry. During the last year alone the number of beekeepers has doubled, and it has been found that Manitoba has enormous resources in the shape of honey-bearing plants which have enabled

the beekeepers to produce 1,800,000 pounds of honey during the year, an average of 133 pounds per hive.

The Future

Good work has already been done, and there is much that might be done. In addition to the splendid financial assistance provided under the Act, we believe that even better results could be obtained if the Federal Government could provide a few experts to

co-operate with extension agencies in the various provinces. For instance, Agricultural Representative work is now carried on to a certain extent in each province. A federal officer who could spend a week in conference with the representatives in each province would be a means of bringing to each conference many valuable suggestions; and the same would be true of boys' and girls' club work, home economics, etc.

THE RECONSTRUCTION OF ALBERTA'S DAIRY INDUSTRY

An Account of the First Year's Experience under Government Cream Grading

RECONSTRUCTION is a word that has come into familiar use since the world war. It is a word that might aptly be applied to what has been going on with respect to the dairy industry in the province of Alberta within the past year. The recovery and retention of quality markets for Alberta butter, in other words, has been a problem receiving the serious attention of all the interests concerned in the industry in that province.

In the years before the war, when Alberta was making rapid strides in all phases of development, the province, due to its great natural advantages, and to the fostering of the dairy industry by a highly competent dairy branch of the department of agriculture, very quickly established itself as one of the premier provinces of the Dominion in the production of dairy products of a high quality.

But the war brought its economic changes. It is a well known fact that the war years developed conditions in connection with the food supply of the world, which laid strong temporary emphasis upon the necessity of increased production of food pro-

ducts. These conditions led to the establishment of comparatively high price levels and a narrowing of the customary spread in prices in favour of quality products. This was a world condition and affected very largely the manufactured products of an animal origin, including dairy products. In the period of reconstruction following the war, it became imperative for the various industries to take stock of their ability not only to re-establish their former trade connections, but also to secure new outlets for the speedily increasing volume of production of such commodities as could be produced to best advantage.

Alberta, in company with other provinces, soon realized the result of conditions created by the war, particularly with respect to its dairy industry. In the year 1917, Alberta butter had reached a high pinnacle of quality. Of the total amount of butter graded in the season of 1917, by government graders, 56 per cent reached the "special" class. From that point, however, deterioration in grade began to set in. From 1917 to 1921 the percentage of special grade

butter dropped from 56 per cent to 7.7 per cent, while percentage of "firsts" increased from 36.3 per cent to 66.7 per cent, and the percentage of seconds increased from 6.7 per cent to 24.7 per cent.

This was the situation when, at the beginning of 1922 those concerned decided that steps were necessary to bring the industry back to its previous high status, and to set it once more upon the road to ultimate and permanent prosperity. There was no doubt about the ability of Alberta to stage a "come-back" in this regard. The forward strides the industry had been making had been halted by conditions arising out of the war, and an actual retrograde movement had set in. This condition was not confined to Alberta, and other provinces were beginning to take reconstructive steps. Officials in Alberta frankly faced the situation. The question was, where did the chief responsibility for neglect of quality lie, and what were the steps most advisable to take?

Figures produced by the dairy commissioner served to show that to a large extent responsibility for deterioration in grade rested with the producer. Out of a total of 7,852 churnings graded in 1921, 50 per cent showed more or less stale cream flavour. The creameries had little to do with this, save wherein they failed to express grades. The fault lay in the quality. But while no doubt the producer was primarily responsible for this condition, the system of cream buying stations which has sprung up in the past few years fostered neglect of quality. The element of local competition became a strong factor, and producers of high quality cream often found themselves getting no more for their product than producers of low grade cream.

Under this condition of affairs, many cream producers became im-

bued with the notion that once they had disposed of their cream to the local cream buyer their interests ceased. Perhaps they had obtained a relatively good price for their cream, irrespective of quality, and they departed satisfied. But that was only a temporary advantage. The road to continued success is longer than that. It stretches right down to the door of that discriminating personage, the ultimate consumer, and nothing but the best will suit him. The marketing of a quantity of low grade cream very soon finds its reflection in a lower standard of butter, and a consequent falling off in price for cream. This is exactly what had been happening in Alberta.

In a review of the situation, it became obvious that the elimination of the cream-buying stations would be a long step toward the objective of improved quality and better prices for the producer. Other western provinces had eliminated this system, and reported most satisfactory results. But a still further step was also thought advisable, namely, the establishment of government grading of cream, a step which had not hitherto been taken by any government.

Thus it was that, after consultation with the representative dairy interests, and strong recommendations from those interests and from officials of his department, Hon. Geo. Hoadley, minister of agriculture, introduced at the session of 1922, legislation putting into effect the elimination of the cream stations and taking the steps necessary to put government cream grading into effect.

The great object sought in the elimination of the cream stations was to clear the channel, to straighten out the line, between the producer of quality cream and the market for quality butter. In other words, it sought to establish conditions under which the farmer who took the trouble to put the quality into his cream—and certainly no one else

could put it there—would get the full benefit of his efforts by reaching the best markets available and getting the price for his product that he was entitled to.

This would be accomplished, the department believed, by the elimination of the cream-buying stations, which would result in the shipment of cream direct to creameries, and by the establishment of a system of government grading at the manufacturing points.

Bringing the question down to a matter of dollars and cents, what was to be the direct benefit of the new system? In the first place, it was estimated that the direct saving to the industry would alone constitute a very large item. It was stated that the old system of cream-buying stations cost the industry \$250,000 annually. The new system of restricted service at local points which is permitted under the amendments, should not cost more than \$50,000, it was estimated. In addition to this, the legislature voted \$40,000 for government grading. This made a total under the new system of \$90,000, or approximately \$100,000. If these figures were eventually borne out, it would result in a direct saving of \$150,000 a year.

Furthermore, the improvement in quality under the new system would result, the dairy commissioner confidently believed, in increased revenue of \$150,000 in the first year. This improvement would increase and be cumulative from year to year, increasing the amount of revenue to the industry and resulting in the securing and holding of quality markets for Alberta butter.

The new system went into effect on May 1, 1922. It required no more than six months' experience to prove beyond the possibility of doubt that the claims made for the new scheme had been justified. Much of what was hoped would be accomplished in a year has been accomplished in half

of that time, and figures have been presented to the Minister of Agriculture by the dairy commissioner which prove conclusively that direct returns to the producer have been much greater than anticipated.

The following table shows not only how the deterioration in grade has been checked, but how the improvement in grade has been such that the product will, before long, have climbed again to the status of 1917:

	1921	1922
Butter graded, May to October (lbs.)..	5,680,015	6,204,573
"Special" grade.. . . .	8.0%	26.8%
"First" grade, flavour score 40 points.. . . .	30.1%	35.0%
"First" grade, flavour score 39 points.. . . .	35.8%	19.0%
"Second" grade, flavour score 38 points.. . . .	19.1%	13.7%
"Second" grade, flavour score 37 points.. . . .	6.0%	4.2%
Off grade.. . . .	1.0%	1.3%
	100.0%	100.0%

So much for the improvement of the quality of the butter. What has been the direct benefit to the producer in dollars and cents? During the six months from May 1 to October 31, the government graders stationed at the 46 creameries in the province classified cream containing over nine million pounds of butterfat. In spite of the fact that during this time the general market for creamery butter was approximately one cent per pound lower than that of 1921, and after making due allowance for this fact, the cream producers received nearly two cents more per pound butterfat, direct shipment basis, for special grade cream; and those who disposed of their cream last year on a cream station basis, this year received six cents more per pound butterfat. This means that during these six months the creameries have paid the producers at least \$250,000 more for their butterfat than last year, with the cream stations in operation, and more than justified the claim made

last May that the new system would effect a yearly saving of \$150,000 to the dairy industry. Generous praise is due the creamery operators of the province for loyally carrying out their part in this practical demonstration of "vertical" co-operation, and also to the thousands of farmers who realized the situation and responded to the call for quality production.

So much for the direct financial benefits. But there is the larger view, the vision of what this form of co-operation can be made to do for the future of our dairy industry, in the re-establishment of Alberta but-

ter as the desirable product in the best available markets, and in the stabilizing of dairying as one of the province's important and growing industries.

Alberta creamery butter production for 1922 will exceed 15,000,000 pounds, an increase of over two million pounds over 1921. It will be seen by this that the problem of finding and holding remunerative markets for the surplus is by no means diminishing, and with the increasing production there is the increasing necessity for quality production and team work to that end.

MEETING THE FARMERS' FERTILIZER NEEDS HALF-WAY

How the New Brunswick Department of Agriculture Helps the Farmer
to Procure Cheaper Fertilizers

By O. C. HICKS, B.S.A., Superintendent of Soils and Crops

JUST as the Legislature of the Province of New Brunswick was the first governing body of any of the Canadian Provinces to institute a soil survey, undertaken in 1849 by Professor Johnston, F.R.G.S., to disclose the agricultural capabilities of the country, so, it was the first Provincial Legislature to introduce, three generations later, legislation for the conservation of the crop-producing power of the soil.

An Act, significant in the annals of state measures for the development and utilization of natural resources, was passed in 1920 by the New Brunswick Legislature authorizing the Minister of Agriculture to purchase a limestone deposit, a manufacturing plant and machinery, and to make agreement for manufacturing and preparing agricultural lime. This Act was the culmination of a demand which had arisen among the farmers of the Province for crushed limestone to be used as a fertilizer

to renew the virgin productivity of their farms, and to accomplish this result at a minimum cost.

The extent to which the practice of liming with pulverized limestone developed and the wonderful results of its generous application, surpassed the expectations of the sponsors and supporters of the scheme. The low price at which the product is offered under contract with the operators and the reduced freight-rate conceded by the Railway Commission of Canada, places an economical method of soil enrichment within the reach of every farmer whose wagon haul from railway station to farm does not exceed five miles.

Appreciation of the facility for securing lime is shown by the patronage extended to the Government plant, situated at Brookville on the Canadian National Railway System, near St. John City, during the two years since the plant began operations. The total output to date, close

of fiscal year 1922, was thirteen thousand tons. This quantity was used to fertilize several thousand acres planted to wheat, oats, turnips and potatoes. During the rush season preceding the commencement of spring seeding operations a maximum monthly output of one thousand seven hundred tons was attained. Shipment was made mostly in bulk, carlots, at the contract price of three dollars a ton; though bagged lots formed no small proportion of the output except during the rush period.

To say that every acre to which limestone is applied will produce as well as though a high grade commercial fertilizer were used, and that the difference in cost of these two materials is a clear saving, would be "drawing the long-bow" on fact. Yet, so remarkable are the effects of pulverized limestone, that many farmers who have invested the price of one ton of high-grade commercial fertilizer in a carload of lime, have changed their former practice of "fertilizing" to "liming."

Testimonies in appreciation of liming generally state, in terms of increased bushels or tons, a comparison of its use on treated fields with untreated fields. Those quoted, however, are sufficiently novel to illustrate facts which augur well for a more widespread use of raw pulverized lime-rock. An experienced farmer wrote as follows:—

"I have used several carloads of pulverized limestone and I would not farm without it when it can be obtained. I have no experience in potato culture but for wheat, oats, barley and especially on hay and clover, it cannot be beaten."

Another, who had used mussel mud and commercial fertilizers but who now depends on lime, wrote:

"I had used the lime in small quantities for two or three years with good results. Last spring I

bought a carload and, although the freight cost almost as much as the lime, I consider I am well repaid for the money invested, for it is the most profitable fertilizer I ever bought."

Still another wrote:

"I wish to say that the results have been more than I had any idea of. Last year, notwithstanding the very dry season, the grain crop was very good and was admired by all who saw it. This year I got a wonderful crop of hay early in the season. The last of August there was a second fine crop of clover. At the present time (October 1, 1922) I am cutting a third crop of clover hay this season. It was nothing else but the lime which made such a thing possible."

Not only have the fertilizer needs of those farmers having a low railway transportation rate and a short wagon haul been met by cheap lime, but those also whose farms are near the estuaries of rivers or coastal waters where there are extensive and easily worked beds of shell-marl. To encourage liming with marl, a bonus to defray in part the cost of a dredge or other digging appliance, is available by Statute. Many thousands of tons of shell-marl are annually procured along the shores of the coastal counties, and much of the agricultural wealth of these sections can be traced to this beneficent legislation whereby the riches of the sea are returned to the land in the form of a crop fertilizer.

It is true that cheap lime meets the farmers' fertilizer needs only in a figurative way. In a more literal manner these needs have been met by legislation that has aimed to provide him with a means to secure cheaper chemical fertilizers through co-operative purchasing by farmer organizations. Corporate powers

were conferred upon a central organization of the Agricultural Societies, in 1914, to purchase fertilizing ingredients, and to arrange for the importation, warehousing and distribution of the same to any agricultural society. Since that time an average of over one thousand tons of fertilizer chemicals has been distributed to farmers annually by the New Brunswick Agricultural Societies United, at a saving of twenty-five per cent on the price of the factory-mixed brands.

Government demonstration work by district Agricultural Representatives in the home-mixing of fertilizer chemicals, the compounding of fertilizer formulæ, and comparative test applications of home-mixed and factory-mixed grades have contributed not a little to the education of the farmer on the whole subject of commercial fertilizers.

Concern for the production of the food supply of the present and future generations is evinced by those in high authority in all civilized countries. Many and varied are the safeguards by which governments have sought to attain to a condition where abundant food supplies, the product of a flourishing home agriculture, would be perpetually assured. To this end various countries jealously guard such mineral deposits and other sources of materials as are useful in agriculture as fertilizers. Germany and Chili levy royalties on the export of potash and nitrate salts respectively. So marked was the concern of

the United States authorities for the preservation of the fertility of the soil that, at a conference of the States' Governors at Washington in 1908, it was suggested that a law should be passed prohibiting the export of phosphates to foreign countries.

All States and Dominions exercise a parental control over the fertilizer trade in the interest of the consumer, and all make generous appropriations for scientific research directed to discover new sources of fertilizing materials, and to conduct cultural experiments to determine the utility and effects of fertilizers. Effective as are the tendencies of such measures towards keeping a reserve of plant food for the future and in promulgating information for its wise and economical use, the positive action of such policies by which the farmer profits because of cheap fertilizer, is obscured. But the wisdom and discernment of the policy of the New Brunswick Government of providing manufactured limestone to the farmers of a province is unique among the methods of government aid to maintain soil fertility.

The very practical form of governmental cooperation and aid to meet the farmers' need for cheaper fertilizer in this Province can justly be claimed to have been successful in grappling with the problem of perpetuating the soil's power to produce profitable crops.

PROVINCIAL POTATO FAIR

By J. B. MUNRO, B.S.A., Soil and Crop Instructor

SOME idea of the importance of the potato industry in British Columbia may be gathered from the success of the recent Potato Fair held in Grand Forks, B.C. This is the first fair devoted completely to

potatoes and potato products in British Columbia. It was held by authority of the Honourable the Minister of Agriculture under the direction of Cecil Tice, Provincial Potato Specialist, with the assistance

and co-operation of the Grand Forks Board of Trade and various local organizations. The exhibits included over two hundred individual entries of commercial and seed potatoes, nine entries of commercial potatoes in sacks, seven district displays each composed of eight individual lots and seven displays of dishes prepared from potatoes. More than seventy boys and girls, pupils of the Grand Forks schools, entered in the potato-judging competition held in connection with the fair.

Every part of British Columbia was represented at the Potato Fair. Entries from the main line of the Grand Trunk Pacific Railway, from Vancouver Island, the Lower Mainland, and the several valleys of the Interior were assembled in competition. The district displays were mainly from sections where certified seed work is being conducted by the Provincial Department of Agriculture.

It is interesting to note the number of prize-winners and average score in commercial seed and district potato displays by those districts sending the largest number of exhibits to the fair.

Windermere: Exhibits, 29; prize-winners, 20; average score, 96.4.

Courtenay: Exhibits, 33; prize-winners, 20; average score, 95.4.

Chilliwack: Exhibits, 32; prize-winners, 13; average score, 93.2.

Grand Forks: Exhibits, 33; prize-winners, 3; average score, 92.2.

The growth of potato work in British Columbia may be judged from the fact that in 1921 only eight lots of potatoes were shown at the Potato Fair held in Victoria in connection with the Provincial Seed Fair, and in February, 1922, at Chilliwack ninety-seven entries were made at the fair

held in connection with the Dairy-men's Convention. Upwards of three hundred lots of potatoes were shown at the recent exhibition.

The prize list was large and included classes for certified seed, uncertified seed, commercial potatoes, boys and girls exhibits, cooked potato dishes, commercial sacks of potatoes and district displays. Three silver cups were among the special awards as well as two potato graders, potato sprayers and other valuable pieces of equipment for the potato grower.

Conferences for potato growers were held in the afternoon and evening of three days of the fair and addresses were delivered by prominent officials of the Federal and Provincial Departments of Agriculture, the University of British Columbia and by Professor Hungerford of the University of Moscow, Idaho.

The growing of certified seed has been established in several of the best districts of the Province. The estimated production this year will be in the neighbourhood of 10,000 bushels, all of which will find a ready market in the Province. Growers of commercial stock have come to the conclusion that best results and highest yields are obtained through the use of certified seed potatoes. This year the growers have set their prices for spring delivery at \$2.50 per cwt. or \$40 a ton f.o.b. shipping points, and buyers are quite willing to pay this price for the seed.

At present a great many varieties of potatoes are being grown in British Columbia but the number is gradually being reduced. In spring certified seed only varieties best suited to the districts are advocated and these standard varieties are gradually being adopted to the exclusion of many of the less valuable kinds.

PART III

Agricultural Education and Related Activities

SASKATCHEWAN BOYS' AND GIRLS' CLUBS

By FRED W. BATES, B.A., M.Sc., Director of Rural Education Associations, and HARRY SAVILLE, B.S.A., Organizer of Boys' and Girls' Clubs

ARTICLES dealing with the aim and progress of elementary agricultural instruction in Saskatchewan have appeared from time to time in the *Agricultural Gazette*. In the last number for 1922, the school phase of the work was discussed while a previous number contained a short article on the school exhibition and related activities. It is the purpose of this article to show the place and development of one of these related activities, viz., Boys' and Girls' Clubs.

Club work in Saskatchewan has developed along lines somewhat different from that obtaining elsewhere as it has grown from within the school outward rather than *vice versa*. The first school exhibitions consisted of work done in school or on the school grounds. With the spread of the movement came a natural demand for special contests in home activities such as pig raising, poultry raising, potato growing. At first these consisted merely of exhibits, but soon the necessity for more careful direction became evident, resulting in the development of regulations which made it necessary for the contestants to actually care for and in some cases own the exhibit.

The first steps in organized club activities were taken in 1916 when the Rural Education Associations of the Weyburn Inspectorate arranged contests in the "Raising and Feeding of Swine, Sheep, etc.," which were open to "boys and girls up to eighteen years of age" living in the territory covered by the association. In

1918 the possibilities of this type of work became so apparent and the need for guidance so pressing that the College of Agriculture appointed an assistant to the Director of Extension who should devote his time to the promotion of club activities. In 1920 this phase of work was transferred to the Department of Education in order that it might be linked up more closely with the school exhibition system of the province. Since then the interest in this type of work has continually increased, although the financial situation has during the past year prevented the expansion that had been hoped for.

Since the Boys' and Girls' Clubs in Saskatchewan are under the direction of the Department of Education, the main emphasis is placed on the educational rather than the economic phases of the work. The club is an organization of young people based on the principle that education should be related to the life of the community. Educational activities carried on by children should consist not only of the traditional class-room subjects, but also of those subjects such as agriculture, nature study, gardening, household science, manual training, and public speaking, which have a more direct bearing upon the home life. Boys' and Girls' Clubs aim to show (1) How important these are in our lives, (2) How interesting they are if approached in a proper manner, (3) How they may be taught and conducted in the best way. The ultimate purpose of club work is to provide opportunity for

the full expression of the natural talents of the boy or girl under direction that will foster their expansion to life's highest fulfilment.

The question is often raised as to the difference between the contests of the school exhibition and club contests. Strictly speaking, the school exhibition is simply an exhibition of the work of all grades in the class-room and of work done outside the class-room, such as school gardening, which is an integral part of the school work. It is primarily an exhibition of the work of all pupils attending school, but has also included other activities such as stock raising and grain growing. The club differs from this in that it enrolls only boys and girls of the ages 10 to 18. It aims to reach all boys and girls of these ages, whether attending school or not.

The school exhibition provides for a "competition," but club work is a "project." The latter calls for sustained effort covering several weeks and the exhibition or competition is merely the climax coming at the completion of the project. Very many boys and girls leave school at an early age and will not return; the club contests maintain their interest in young people's activities and provide an opportunity for the school to maintain its hold on them; especially is this so where the school and club fairs are held jointly.

While in isolated cases club work may necessarily require to be carried on independently, experience has shown that the best results are achieved when it is developed under the auspices of some live existing community organization. The Rural Education Association has so far proven the most successful in developing this type of work although in many cases the School Exhibition Association has fulfilled the same function. Frequently the Agricultural Society or the Homemakers' Club has accomplished very satisfactory

results. Every effort is put forth to use existing agencies in order to avoid duplication and prevent any unnecessary increase in community organization.

The amount of territory covered by a Club depends to some extent upon that served by the parent organization. It usually corresponds with that embraced by the school exhibition and seldom has a radius of more than ten miles. Each school district within the organization constitutes a "branch" of the Club and any boy or girl residing in the territory, whether attending school or not, may become a member.

When the Club is conducted as an activity of a Rural Education Association or other existing organization, the board of directors of the parent organization is the governing body. A club committee is appointed including a secretary-manager and branch leaders to guide in the various activities. Upon the enrolment of the boys and girls as club members, those resident in each school district form themselves into a branch club with officers selected from among themselves, and regular meetings are held. The club committee determines the projects to be undertaken, raises the necessary funds and in general directs the work.

While there is no restriction in the number of projects to be taken up by any member, an endeavour is made not to overload the individual. This also facilitates supervision and makes competition more keen. The following projects are recommended—

- (1) Calf Raising.
- (2) Pig Raising.
- (3) Sheep Raising.
- (4) Colt Training.
- (5) Poultry Raising.
- (6) Potato Growing.
- (7) Gardening.
- (8) Canning.
- (9) Stock Judging.

THE AGRICULTURAL GAZETTE OF CANADA

- (10) Grain Growing and Judging.
- (11) Field Corn Growing.
- (12) Cow Testing.
- (13) Nature Study.
- (14) Literary.

The Department provides bulletins and other forms of literature while the organizer advises the clubs and makes as many personal visits as possible. At fair time at least one

outside judge is provided. During the season canning demonstrations and stock-judging courses are arranged. No assistance is given by way of grants, all financing being done locally.

During 1922 there were 54 clubs in operation with 140 branches having a membership of 2,537, of which 1,330 were boys and 1,207 girls. The projects engaged in were as follows—

	Calf Raising	Pig Raising	Sheep Raising	Colt Training	Poultry Raising	Grain Growing	Corn Growing	Potato Growing
Boys.....	212	157	41	95	410	171	123	447
Girls....	66	49	7	17	366	77	90	251
	278	206	48	112	776	248	213	698
	Gardening	Canning	Stock Judging	Cow Testing	Nature Study	Literary	Others	Total
Boys.....	614	64	213	11	168	112	154	2,992
Girls.....	624	484	35	0	215	163	231	2,675
	1,238	548	248	11	383	275	385	5,667

As all club work is financed locally, it will readily be understood that financial conditions seriously affect its development. The year just ended has been one of serious stringency throughout the greater part of the province; consequently the increase in club activities which had been hoped for did not materialize. Many centres suspended all lines of effort not absolutely necessary but are

laying plans to resume activity the coming season. The interest in junior work of every phase is steadily growing and the value of directed effort is becoming more and more appreciated. We are looking forward to 1923 as our best year and are planning to make the club work of even greater value than it has been in the past.

THE SASKATCHEWAN FARM BOYS' CAMPS—WHAT THEY ARE, AND HOW THEY SERVE THE BOYS OF THE PROVINCE

By K. W. GORDON, Assistant Director of Agricultural Extension, University of Saskatchewan

ABOUT eight years ago, the late Lieutenant H. N. Thompson, then Weed and Seed Commissioner for Saskatchewan, conceived the thought of gathering together as large a number as possible of farm boys every year, in order to show

them the best in live stock and farm produce that their province could produce and instil in their receptive and developing minds the ideal of being able some day to equal or even excel the best when they become managers of their own farms.

The result was that in 1915, the first Saskatchewan Farm Boys' Camp was organized at Regina through the co-operation of the Regina Fair Board. For four years the camp grew and prospered and became one of the biggest events at the Regina Fair. In 1919, the number of applications received from Agricultural Societies desiring to send teams was so great that it was found impossible to conduct the camp as one group, and with the co-operation of the Saskatoon Exhibition Board, who were as hearty in their endeavour to assist as Regina had been, two camps were held, namely, one during Regina Fair week and one while Saskatoon was holding its exhibition.

Since the camp movement started, over 2,500 boys have attended camp, either at Regina or Saskatoon, and have come under the influence of the best in agriculture that the province can produce.

The boys that attend camp consist of teams of five boys between the ages of fourteen and seventeen years, accompanied by an adult supervisor. They represent one of the hundred and fifty Agricultural Societies which are distributed all over the province.

The Agricultural Societies are at present the only organizations that have the privilege of making application to send teams to either camp. These teams are selected in various ways, but the most common practice is for the Society to have all boys of required age take part in a local stock-judging competition. The reward for each of the five boys making the highest standing is to become a member of the team representing their society and to have a free trip to either Regina or Saskatoon.

The main feature of the camp is educational, and, in a secondary way, inspirational. In 1919, when it was planned to have annually two camps in the province, it was arranged to

make them form a complete agricultural course. In Regina, the boys are known as Juniors. They have not previously attended a camp, and should be between the ages of fourteen and sixteen years. The main educational features in the programme are lectures and demonstrations in judging heavy horses, beef cattle, dairy cattle, and bacon hogs, and competitions in judging these types of animals are held. Four outstanding and typical specimens of each of the above mentioned types are chosen as a class to be judged. It is felt that having these boys examine, handle and judge these outstanding animals cannot help but leave a deep impression on their minds as to what a really good animal should look like. At Saskatoon, the boys are known as Seniors. They should be fifteen to seventeen years of age, and should have previously attended the Regina Camp. The only stock judging conducted in Saskatoon is in mutton sheep. There are, however, lectures on field husbandry subjects, and competitions in judging grain and identifying crops, weeds and weed seeds. The grain-judging is to teach the boys how to select good seed. The competition in identifying crops brings to their notice new types of forage crops and new varieties of cereals. The weed work impresses them with the importance of weed control and makes them familiar with common weeds as seen in threshed grain or in the fields. In the contests at both fairs, the boys compete as individuals and as teams. A fifty dollar scholarship is offered to each of the boys winning the first place in the different competitions, and a seventy-five dollar scholarship to the boy having the highest total aggregate. These scholarships are tenable at the Saskatchewan Agricultural College. Books dealing with live stock and farm crops are also

given to each member of the group standing first as a team in each of the contests.

At Saskatoon, the teams are taken to the university demonstration plots. Probably in the forenoon they will be taken through the plots and the different experiments being conducted will be explained to them. They are then shown the various crops grown, and their usefulness, either for seed or forage, is explained. In the afternoon they are asked to identify a certain number of growing crops. They must also be able to recognize and name twenty or thirty weeds in full growth. Besides these identification tests, a grain-judging competition in wheat or oats is also arranged.

In this way, those competing acquire a great deal of useful information in a very enjoyable way. The contests, however, are not the only educational feature of the programme; for while the boys are at either Regina or Saskatoon, they are taken to all the places of interest in these cities. When in Regina, they are shown the Parliament Buildings, the P. Burns Packing Plant, etc., and while in Saskatoon, they are conducted through the University and also taken out to the big Dominion Grain Elevator, which is capable of storing over two million bushels of grain, and to the Dominion Forestry Farm at Sutherland, where the need for trees on the open prairie and the method of planting are explained.

Last year, the Regina and Saskatoon Exhibition Boards again generously agreed to refund railway fares above seven dollars to all boys attending the camp.

When in camp, the boys and their supervisors are the guests of the Exhibition Board. They are accommodated, as a rule, in one of the long corridors. The boys make their own cots, and the sleeping quarters are inspected daily to see that everything

is clean and in place. Points are given each day to the team that keeps its quarters the tidiest, and a prize is generally awarded to the group of boys scoring the highest number of points at the end of the camp.

Discipline is maintained by decentralizing control. The camp is divided into four or more companies, and a supervisor is chosen to command each of these units. He is known as the Company's Captain. Each of the team leaders takes the place of a Lieutenant in charge of his own group. A camp manager and assistant, provided by the Extension Department, have full control.

Recreation is not forgotten, and every year the local Y.M.C.A. has undertaken to take charge of the sports, group games, drills, etc. It is their business to study boy life, and they know exactly what is required. The physical training in the morning, before breakfast, and the games and sports in the evening are always enjoyed. If it is wet, there are sing-songs and indoor games in the gymnasium. As a rule, talks on health and hygiene are included in their programme. The camp would lose a great deal of its usefulness if it were not for the "Y".

Last year the Camp movement was extended to reach a still larger number of farm boys. The largest number that can be conveniently handled at either Regina or Saskatoon is about three hundred at each place, and this number was exceeded at Regina this last summer. This means that many boys in the province have been unable to attend camp. For this reason, smaller camps have been arranged at a number of the Class "B" fairs and last summer, three such camps were held, one at North Battleford, one at Melfort and one at Yorkton. These are conducted along the same lines as the larger camps.

only the boys are a little younger, thirteen to fifteen years of age. At the larger camps the boys stay for four days, but at the smaller camps only for two days. The competitions, lectures, games, etc., are, however, just the same. It is hoped this year to have four or five of the smaller camps as well as the two main camps.

No one can realize the vast amount of good these Farm Boys' Camps are doing for the province. To many of the boys taking part in the competitions, it is the first trip away from the home farm. Many have never

been in a city before and have never seen the sights which to us have lost their interest but to them are new and wonderful. No one knows what resolutions are being formed in the young minds; resolutions, perhaps, to take advantage of a university course; or to some day own the best herd of cattle in the province. The seed sown during the Farm Boys' Camps will bear abundant and useful fruit. The boys of to-day are the farmers of to-morrow, and the trend of agriculture will depend on the training they receive.

AGRICULTURE IN THE NOVA SCOTIA SCHOOLS

By L. A. DeWOLFE, B.A. M.Sc., Director of Rural Science

IN the Province of Nova Scotia, a part of the Federal grant under the Agricultural Instruction Act has been placed at the disposal of the Department of Education. In administering this portion of the grant, we have interpreted the purpose of the Act to be educational rather than vocational. We believe that the public schools, taught by young girls, cannot turn out full-fledged farmers. We do believe, however, that the schools can give a fairly good idea of where the farmer stands in relation to the rest of the world. We can, for example, discuss the farmer's problems and activities in the geography class, and thus vitalize that subject.

Though the school will not make the boy a successful live stock man, it will call his attention to factors governing live stock which he might never have learned on the farm; then, whether the boy becomes a farmer or not, he will have a broader conception of the economic problems of the country on account of having his school lessons based on farm experiences. The Act will be of greater service if it teaches a large number

of our children the science of farming and related industries than if it teaches only a limited number the art of growing field crops and farm animals.

Although our training is non-vocational, it may lead to a vocation. If a boy should become a farmer, his common-sense training will make him a better farmer and a much better citizen than he otherwise would have been. Here and there, the bigger vision of a farmer's opportunities will induce a boy to remain on the farm. Statistics do not tell the whole story. The number of men on farms is not so important as the quality. We are trying to improve the quality of the next generation.

Farming, like any other industry, is economic. School children are not old enough to know the value of money; they will not, therefore, seriously consider farming as a future occupation; they think only of the present; they want "a good time." One purpose of the school, therefore, is to furnish the good time. It is a social problem—the problem of making young people in the country happy and contented.

We also attempt to develop common sense. By making agriculture the basis of home projects, we are popularizing the time-honoured school subjects. For example, instead of memorizing the climate of Argentina as an isolated topic, we raise the question of how a hail storm in that country in January might affect the price of flour in our own country. This leads to a discussion of the wheat-producing countries of the world and the seasons at which the crop is harvested and marketed. A crop failure in one country affects prices in other countries. From this, the boy is led to study market reports and try to account for any great fluctuations. In other words, he is beginning to think about things; he is becoming intelligent.

Similarly, transportation problems are discussed. The markets of the world are studied; and the boy learns that to produce farm crops is one thing, but to market them is another. He will thus learn to be governed somewhat by the law of supply and demand. To know the science of soil cultivation is not enough, important as it is. When it is discovered, however, that competition drives us to do our best, we want to know the best way of doing things. Hence a desire to know is created. That is the greatest thing that can be accomplished in education.

To produce good crops requires a knowledge of soil physics, soil chemistry, insect life, bird life, plant phy-

siology, and animal hygiene. To market the produce calls for a knowledge of geography, arithmetic, reading and writing, the world markets, transportation systems, labour problems, climate, and banking systems—all have a bearing on the farmer's prosperity. Studying geography from this, the agricultural point of view, the child sees that, after all, the subject has some relation to his own personal affairs.

Lest this become a theoretical essay, however, we hasten to say that in Nova Scotia, our share of the Federal grant is spent largely on training teachers at our Normal College and Summer School. They are trained along the lines indicated in the foregoing paragraphs. Not all teach as successfully as we wish, but they do much from the agricultural view-point. The grant has made such teacher-training possible. Without it, agricultural teaching in our schools, even in this indirect way, would suffer. School exhibitions, one of the big results of such training, would lose their driving power. We might slip back to the old custom of only the dull boy remaining on the farm while the bright ones went to the towns.

We are striving, and with some measure of success, towards a cultured rural population, enjoying good homes with attractive surroundings; taking an intelligent interest in civic affairs; having time for reading and recreation; in short, a people who use their heads as well as their hands.

DEVELOPMENT OF SCHOOL AGRICULTURE IN ALBERTA

By G. B. VAN TAUSK, M.A.

THE development of school agriculture in Alberta is to a great extent a repetition of what occurred in the older provinces and in the United States.

Agriculture was taught in both the elementary and high schools of the province in the territorial days and at the inception of the province (1905). The Course of Studies for examination for Standard V, approved in July, 1906, prescribes Agriculture. A general knowledge of the following topics was required: Soils, Crops, Live Stock and Dairying; Insects, Weeds, Trees. The pass mark was 34 per cent, and the reference book for teachers and pupils, "Agriculture" by James and McIntyre. In the high schools, standard VI, the same text was used and Bailey's "Principles of Agriculture" given as a teachers' reference. It is significant that the Course of Study gives no outline but simply states: "Agriculture—as in prescribed text." This high school Agriculture was taught in connection with botany.

Up to 1913 with a few isolated exceptions the teaching of school Agriculture and the management of school gardens was done very poorly. Some of the contributory causes were, the lack of appreciation of the subject, the lack of knowledge on the part of the teacher, and the lack or inefficiency of the assistance given by those in authority.

In 1913 a Director of Technical Education was appointed, who devoted part of his time to the organization and supervision of school Agriculture. It was generally felt that Agriculture should be introduced into the schools on a much broader scale than formerly, but that to add a considerable amount of work in

the way of agricultural education, is asking the teacher to do more than can be properly done. Summer School courses in Agriculture were instituted for elementary and high school teachers and school inspectors. A year later Agriculture was put into the third year of the high school as a separate optional subject and an outline compiled showing the scope of the course. A new text book written from an Alberta point of view was introduced into the public schools in 1915. A 125 page bulletin on Agriculture and Gardening in Elementary Schools was issued by the Department of Education in 1916.

The effects of these innovations relative to School Agriculture may be gathered from the following quotations from the reports of the Department of Education:

"There has been also considerable improvement in the teaching of Agriculture in our public schools, due chiefly to the instruction given to the teachers at the Summer School, which had a larger attendance this year than ever before."

"School gardening is becoming an ordinary part of the work of most schools."

"There is no marked improvement in the teaching of Agriculture and nature study except in the case of the few teachers who have had an opportunity to secure some special training in these branches themselves."

"Nature Study and Agriculture were also neglected, as the teachers often do not know how to treat the subjects. The value of Summer Schools was very apparent here."

"With reference to the improvement of instruction in Agriculture and Gardening in both the elementary and secondary schools, I am

pleased to be able to report definite and substantial progress."

"The Inspectors' reports indicate also that the instruction is being given in a better and more practical way."

"The teaching of Agriculture is improving from year to year and the majority of teachers in Grade XI are supplementing the theoretical work with practical demonstrations by means of school gardens and experimental plots. The course of training given at the Summer School by specialists in Agriculture has created a keen interest in the subject and the competitions at School Fairs have stimulated the rural and town schools to attain a higher standard in this branch of school work."

The Summer School for teachers was the greatest factor in improving school Agriculture. As an institution it developed from slightly over one hundred students to six hundred and twenty. In 1922 12½ per cent of Alberta's teachers attended. The number of students taking Agriculture, however, has decreased. The main cause of the decrease was the gradual increase of the number of subjects taught. In 1922 eighty different courses were given, none of which was obligatory.

From 1916 until 1922, School Agriculture was well taught wherever a specially trained and enthusiastic teacher was employed, but in most cases it was made so formal that the real object and spirit of the subject was lost.

The school fair and home garden project movement, which has been fostered mainly by the Provincial Schools of Agriculture, has done as much or more than the classroom in furthering the agricultural education of Alberta's boys and girls. The work that is being done for Alberta boys and girls is accomplished by using the school organization for garden and live stock enterprises and having

members of the Agricultural School staffs give direction in the schools with regard to these activities. During 1916 the number of schools organized for school fair work was only eighty-five, while in 1920 under the direction of the three Agricultural Schools there were held forty fairs, which included 440 schools, 6,500 pupils. In 1922 one hundred and thirty school fairs were held in Alberta with upwards of 1,500 schools participating.

A new course in high school Agriculture was introduced in 1915. This course, with little change is still in effect. It is generally taught by the science masters, many of whom have had Summer School or other training in Agriculture.

At that time 4.3 per cent of the teachers teaching High School Agriculture had good special training; 25.7 per cent had fair special training; 41.4 per cent had some training, and 28.6 per cent had no special training.

In September, 1922, a new course of study for the elementary schools came into effect. In this course for Grades VII and VIII five optional or directive courses have been drafted, two of which, the "General" and "Agricultural" contain Agriculture. As far as Agriculture is concerned the main differences between the two courses are: In the general course Agriculture is mainly appreciative and requires about 100 minutes per week; in the Agricultural course this subject is given 200 minutes and is both appreciative and practical. The aims and objectives of both courses are expressed as follows:—

"The work in Agriculture is intended to give pupils an understanding of the fundamental principles underlying the occupation which is the basis of our wealth and civilization, and to teach the natural laws underlying the pro-

duction of plant and animal crops. It is intended to present these principles in an intelligent and effective manner and to apply them in practical demonstrations such as: home projects, school gardens, identification and care of plants, milk testing, seed judging and other exercises which are adapted to use in

elementary schools. Nor is the aim entirely materialistic. The spirit of the course is to enlarge the vision by actual contact with the facts and practices of farm life and place students in a position to appreciate the conditions of rural life, its problems, and the importance of the Canadian farmer."

THE USE OF BULLETINS AND PAMPHLETS IN THE SCHOOLS

By J. W. FIRTH, B.A., Normal School, Toronto

THERE is no doubt that in the distribution of publications of the Departments of Agriculture, many of them do not fulfil the purpose for which they were issued. Some of them are not removed from their envelopes, and more of them are thrown carelessly aside without being read. These are the seeds that fall on stony ground. But to the teachers of Agriculture in the rural schools these publications are an excellent aid in preparing their lessons and in teaching their pupils. The teachers in training in the Normal Schools are always anxious and pleased to receive any bulletins and pamphlets that are for distribution. The Ontario Department of Agriculture recognizes the value of placing these in the hands of the young teachers as many of these bulletins are sent to the Normal Schools for distribution. These are used by the teachers in training in Ontario for reference in the various subjects and for preparing lessons. In fact these bulletins have taken, in a large measure, the place of text books in the subject of Agriculture.

In using the bulletins for source books, the information is accurate and fairly complete. The books are small and easy to handle. There is usually one subject discussed in each pamphlet. They are well illustrated, and the pictures serve to interest the pupils and convey ideas that they do not otherwise obtain.

When a teacher has a number of these publications, some system should be devised for indexing and cataloguing them. In my work in the Normal School, Toronto, I use the scheme outlined in the Publications Index Book, Pamphlet No. 7, issued by the Publications Branch of the Dominion Department of Agriculture. These pamphlets are kept in my class room and are available for class use at any time. The Librarian of the Toronto Normal School, Miss Merchant, has an excellent system for filing pamphlets and bulletins. They are alphabetically arranged by subjects and kept in folders in a large filing cabinet. The student-teachers, in preparing their lessons, go to the cabinet, select the bulletins with little trouble, and return them to the cabinet when they have finished with them.

Many of the bulletins we distribute to the Normal School students are from the Ontario Department of Agriculture. These young teachers take them to their schools when they begin teaching. The information contained in them is taught to the children in the schools, and this knowledge filters into the homes through the schools. The teacher serves as a link in the chain of communication between the various Departments of Agriculture and the boys and girls who soon will be our young agriculturists.

PART IV

Special Contributions, Reports of Agricultural Organizations, Publications and Notes

IRRIGATION INVESTIGATIONS IN ALBERTA

The accompanying article, prepared by W. H. Snelson, Senior Irrigation Specialist, presents in concise form a statement of the results of investigations conducted for a number of years past by the Irrigation Branch of the Dominion Reclamation Service, Department of the Interior, to determine the Duty of Water.

Conservation of Water Supply Necessary

IT is a disconcerting fact that, even if the maximum facilities for storage are provided and the most careful use is made of the available water, there will not be sufficient to irrigate more than 5,000,000 acres, or about 10 per cent of the land requiring irrigation in Alberta and Saskatchewan. To provide reservoirs for this limited supply and to so conserve and use it at all times that the greatest benefit may be derived by the greatest number, are tasks that to-day challenge the West.

In the early days of irrigation in Canada the streams carried a surplus of water, and irrigators, without thought of scarcity, applied it to their lands with lavish prodigality. Credit is due to the framers of the Irrigation Act, who, learning from the unfortunate experiences of the Western States and looking to the future when every drop of water would be needed, provided in the Act that a limit should be placed upon the quantity of water that might be appropriated for use per irrigable acre. Two acre-feet each irrigation season, or sufficient to cover each acre to a depth of two feet, measured at the point or points of delivery to any farm unit, was considered to be sufficient for the

average need of crops in Western Canada and this quantity was established as the legal duty of water. In recent years it became apparent that even this was an excessive quantity to apply to most crops and the duty was therefore changed to one and one-half acre-feet per acre.

Minister of Interior Must Define Duty of Water

As the Minister of the Interior is responsible for the administration of the surface water supply of Alberta and Saskatchewan and particularly as he must define the duty of water—or water requirements of crops—according to locality and soil, duty of water investigations were commenced several years ago, from the results of which it is now possible to draw conclusions of great value and interest.

Need of Information in Irrigation Practice

A majority of the settlers on the irrigated lands of the West have an insufficient knowledge of the principles of irrigation practice and must be furnished with information and practical demonstrations in order that each irrigable acre may be so farmed and irrigated as to ensure

that the maximum possible production will be maintained from year to year and that, in so far as possible, water-logging of lands with the accompanying undesirable conditions of rise of ground water-table and surface concentration of injurious alkalies will be prevented.

There is a general tendency for irrigators to apply an incorrect amount of water to the crop being grown; to apply irrigations in such excessive depths per application as to contribute to the rise of the ground water-table through large percolation losses; to plan their distributary systems unwisely and thus make impossible the application of economical irrigations; and, due to a lack of understanding of the seasonal water requirements of crops, to irrigate at the wrong time.

Outline of Irrigation Investigational Work

In order to secure data which would serve as a basis for a definition of the legal duty of water, and from which principles for the guidance of water users could be formulated, the following work was carried out.

In 1913 irrigation investigations were begun in the Coaldale district of Southern Alberta where irrigation specialists, working in co-operation with the farmers, measured the water used in growing common crops under average field conditions.

In 1914 experiment stations were established at Strathmore and at Ronalane, Alberta. At these stations varying depths of water were applied to crops in order that reliable data might be obtained relative to:

1. The amount of water required to produce the maximum yield of specific crops when grown under varying conditions of soil fertility, soil texture and climate.

2. The proper depth of water to apply per irrigation for different soil types and for different crops.

3. The relationship between the irrigating head and the distance between distributing ditches.

4. The seasonal water requirements of various crops, or the times when irrigation water should be applied.

In 1917 the Dominion Irrigation Experiment Station was established at Brooks, Alberta. The most reliable and complete experimental data have been secured from this station because the soil conditions were more suitable and the experiments were much more carefully planned and carried out than was possible at either Strathmore or Ronalane.

Thus since 1913 the Reclamation Service has been gathering at Coaldale, Strathmore, Ronalane, and Brooks information regarding the duty of water for a variety of crops under climatic and soil conditions which are typical of different parts of Southern Alberta.

Duty of Water

Theoretically, the duty of water is the volume of water that is required to mature a crop on an acre of land. Under similar conditions it remains fairly constant for the same crop, but, as might be expected, it varies widely for different crops, soils, and climates. The most important factors which directly influence the duty of water, or water requirement, of any crop, are: the physical properties of the soil and subsoil, the fertility of the soil, the size of the irrigating head, the depth applied per irrigation, the preparation of the land, and the climatic conditions.

A grain crop to produce its maximum yield, will require more water; (a) when grown on open porous soils than when grown on heavy impervious soils; (b) when grown on infertile soil than when grown on fertile soil; (c) when applied in large irrigations than when applied in small;



Fifty bushels of Marquis wheat to the acre with five four-inch irrigations, Brooks Irrigation Experiment Station.

and (d) where the land is rough and unprepared than where properly levelled, and more water where the climatic conditions are of an arid nature than where humid.

The accompanying table gives the mean depth of water required to produce the maximum yields of various crops at the Brooks Experiment Station, during the four years 1918-21 inclusive. The results from all the experiments made with each crop are averaged.

For alfalfa, seed alfalfa, grasses, and peas, the figures given represent the requirements of these crops when grown under optimum conditions of soil fertility; for the other crops listed the figures represent the water requirements of these crops when grown under average conditions of soil fertility.

Crop	Total Depth of Water, Irrigation Plus Precipitation, Required to Produce the Maximum Yield per Acre
Alfalfa	31 inches
Peas	27 inches
Wheat	23 inches
Barley	20 inches
Oats	19 inches
Grasses	18 inches
Alfalfa Seed	18 inches
Potatoes	20 inches
Corn	16 inches
Flax	16 inches

The average precipitation during the growing season for the four-year period, 1918 to 1921, was five inches.

The following table shows the effect of soil fertility upon the water requirement of wheat.

Yield in Bushels per Acre	Water Requirements in inches of depth	
	When Grown on Fertile Soil	When Grown on Poor Soil
10	10	13
20	11	18
30	12	24
40	14	..
50	22	..

A yield of thirty bushels per acre required twice as much water where grown on poor soil as when grown on fertile soil. Further, the poor soil

THE AGRICULTURAL GAZETTE OF CANADA

could not produce more than thirty bushels per acre with any amount of water.

Summary of results obtained at Ronalane Station.

Crop	Total Depth Water in Inches Required to Produce Maximum Yield per Acre
Peas..	27 inches
Wheat..	26 inches
Oats..	22 inches
Barley..	21 inches

When comparing Ronalane results with the results obtained at Brooks, two factors influencing Ronalane yield have to be taken into consideration:

yield per acre at Ronalane than at Brooks.

As a result of the experimental work carried on at the several stations the Reclamation Service has reliable data relative to:

(a) How much water crops require.

(b) When and in what depths per irrigation this amount of water is most economically applied.

(c) How and where the distributary ditches should be constructed and located, and

(d) What crop rotations are best adapted to the various districts.



Flax Plots. Brooks Plots, 1922. Maximum Yield, 30 bushels per acre.

(a) All crops grown at Ronalane may be considered as being produced under "optimum" conditions of soil fertility as the Ronalane plots were manured heavily each year, while those at Brooks were not.

(b) The soil at Ronalane is but two to three feet in depth, underlain with gravel, and has a much lower water-holding capacity than that at Brooks. This difference alone will account for so much more water being required to produce the maximum

A complete review of these investigations has been published by the Department of the Interior in Bulletin No. 6, entitled "Irrigation Practice and Water Requirements for Crops in Alberta". This bulletin is now available to those interested in irrigation practice upon application to the Director of the Reclamation Service at Ottawa, or the Commissioner of Irrigation at Calgary.

In addition to distributing the data available by means of Bulletin No.

6. farmers' institutes are held in the various irrigation districts at which a representative of the Reclamation Service addresses the water users upon the different phases of irrigation practice and by means of charts and diagrams demonstrates the water requirements of crops, the methods of preparing land and of applying water, and other related matters.

Field Demonstrations

In order that the information gained at the experiment stations might be applied to field practice,

per irrigation and at such times as local conditions warranted. In carrying out the demonstration work on the tracts selected the irrigation specialist would furnish the farmers with an example of how their fields should be prepared, ditched, and irrigated so as to produce the greatest possible yields per acre in the most economical manner.

The demonstration work has been productive of very satisfactory results. The following will serve as an illustration of the methods used and benefits derived.



Banner Oats following Clover. Brooks Plots, 1922. Maximum Yield, 127 bushels per acre.

and that the water users might be furnished with a practical object lesson in irrigation on their own farms, a programme of field demonstration work was arranged and put into operation in the spring of 1922. This programme provided for the establishment of one or more demonstration tracts in each irrigation district, where irrigation specialists working in co-operation with the farmers upon whose lands the demonstration tracts were located would apply the correct amount of water for the crops being grown, in such depths

In the spring of 1922 a tract of 4.57 acres was selected upon the farm of Mr. F. A. Cook in section 21, township 9, range 16, west of the 4th meridian. The land was ploughed, harrowed, and levelled on May 15 and on May 25 was seeded with Marquis wheat, one and one-half bushels per acre being sown.

The demonstration tract was divided in two parts, one of which received eighteen inches of water in three irrigations of six inches depth each, the other received eighteen inches of water in four irrigations of

THE AGRICULTURAL GAZETTE OF CANADA

four and one-half inches depth each. These irrigations were applied under the supervision of the irrigation specialist. The farmer applied one irrigation only to the main part of the farm.

	Main Field	4½-inch irrigation tract
Cost of irrigating per acre. . .	\$ 1 25	\$ 3 15
Gross returns from crop grown on an acre at 75c. per bushel.	17 45	35 55
Gross returns less cost of irrigating.	\$16 20	\$32 40



Marquis Wheat; Taber Demonstration Plots.

The tract watered with four and one-half inch irrigations produced 47.4 bushels per acre, that watered with six-inch irrigations produced 39 bushels per acre, while the remainder of the farm which received only one irrigation produced but 23 bushels per acre.

The above figures show a gain in gross return of 100 per cent in favour of the field which received the four light irrigations. The farmers in the new irrigation districts express themselves as being well pleased with this work and favour its extension to all parts of the irrigation districts as rapidly as possible.

DOMINION AGRICULTURAL LEGISLATION

On motion of the Minister of Agriculture, the Honourable W. R. Motherwell, the following resolutions were passed by the House of Commons:

Resolved, that it is expedient to amend the Cold Storage Act, chapter six of the statutes of 1907, and to provide that the Governor in Council may enter into contracts with properly constituted co-operative societies or associations, for the construction, equipment and maintenance in efficient working order of public cold storage warehouses in

Canada equipped with mechanical refrigeration, and suitable for the preservation of any food product.

Resolved, that it is expedient to bring in a measure to amend and consolidate the Acts respecting Live Stock, and to provide for the establishment and regulation of live stock exchanges in connection with stock-yards, the making and amending of by-laws, the issuing of licenses for commission merchants, the creation of Exporters' Associations, the regulation and issuing of licenses therefor, the equipment and regulation of

stockyards, the fixing of tariffs of fees therefor, the prescribing of general regulations of stockyards by the Governor in Council, the requirements for shipping of live stock, the creation of inspectors and the providing for ports of importation; and to provide penalties for violations of the Act.

Resolved, that it is expedient to bring in a measure to regulate the Sale and Inspection of Fruit and Fruit Containers, and to provide for the fixing of grades for fruit in closed packages, and apples, crabapples and pears in boxes; for the marking and repacking of fruits grown in Canada: for the packing and branding of such fruit; for the regulation of dimensions of all packages, barrels and other containers of fruit; for the defining of the powers of inspectors; for the different penalties in consequence of the violations of the Act; and for the procedure to be followed in the enforcement of the Act and of the penalties prescribed.

Resolved, that it is expedient to bring in a measure to regulate the Testing, Inspection and Sale of Seeds, and to provide for the regulation of

the sale of clover, grasses, seed grain and fodder seeds, rape, field root and garden vegetable seeds in lots of over one pound, of one pound or less, and of seeds for export when purporting to have been inspected and graded; for the regulation of the importation of seeds; for the fixing of the powers and duties of inspectors, the time limit for complaints, the method of taking official samples, of making official reports and the publication of the same; for the fixing of penalties in connection with the violation of the Act, the liability of certain purchasers, the costs of proceedings, the rights of civil process and the evidence acceptable in all cases.

Following the passing of the Resolutions the undermentioned Bills were introduced and passed their first reading:

Bill No. 9, to amend the Cold Storage Act, 1907.

Bill No. 10, to amend and consolidate the Acts respecting Live Stock.

Bill No. 11, to regulate the sale and inspection of fruit and fruit containers.

Bill No. 12, respecting the testing, inspection and sale of seeds.

THE ADMISSION OF CANADIAN STORE CATTLE TO GREAT BRITAIN

The Importation of Animals Act passed by the Parliament of Great Britain at the Second Session of 1922, states the conditions under which Canadian cattle may be imported to that country. A summary follows of the leading provisions of the Act, which constitutes an amendment of the Diseases of Animals Acts, 1894 to 1914, and this Act may be cited together as the Diseases of Animals Acts, 1894 to 1922.

Importation of Canadian Store Cattle

Canadian store cattle may be landed in Great Britain without being slaughtered, provided:

(a) That they are marked indelibly in such manner as the Minister of Agriculture for Great Britain may prescribe, and have been shipped direct from a Canadian port in an inspected vessel suitable and properly equipped for the purpose.

(b) That the cattle were for a period of three clear days immediately before shipment, and during shipment, kept separate from other animals, and that on examination during the three day period and daily during the voyage by a veterinary officer of the Dominion

none was found to be affected with cattle plague, pleuro-pneumonia, foot and mouth disease, or mange.

(c) That the vessel during the voyage enter no port outside Great Britain, and that the cattle be landed at an approved port.

Upon landing, the cattle will be detained in isolation until they have been examined and their movement has been licensed. In the event of the presence of cattle plague, pleuro-pneumonia or foot and mouth disease being discovered, all the cattle then in the landing place shall be slaughtered.

Should the Minister have reason to believe that either of the diseases mentioned in the foregoing paragraph exists in Canada, these provisions may be suspended for such time as may be deemed necessary to avoid the risk of the introduction of the disease into Great Britain.

Importation of other Animals

The Minister of Agriculture of Great Britain is given power to authorize conditionally the importation of any Canadian animals, other than store cattle. In the case of cattle the provisions are the production of a certificate from a duly authorized Dominion officer to the effect that the animals were within one month before shipment effectively tested for tuberculosis and found to be free therefrom; said animals to be landed in accordance with such conditions as the authorities may prescribe and deem necessary to prevent the introduction of disease, other than tuberculosis.

The expression "Canadian" in relation to any animal means born and reared in the Dominion of Canada. The expression "store cattle" refers to bovine animals, castrated or spayed, which are intended for feeding purposes and not for immediate slaughter.

Compensation is not payable in respect of slaughter of imported animals.

A fee not to exceed sixpence per head will be charged on imported animals to cover veterinary inspection expenses.

Regulation of Movement of Imported Cattle

The schedule appended to the Act provides that the license granted for the removal of imported cattle from the landing place shall authorize removal either to a market, slaughter house or other premises. When cattle are removed to an authorized market they shall be kept separate from all animals other than imported cattle. For their removal from said market, a license is required, and shall accompany the cattle during the time they are being moved. They shall so far as practicable be moved direct and by rail without unnecessary delay to their authorized destination. In transit they are not to be removed from the trucks except for being fed or watered.

Nothing in the said schedule is to apply to imported cattle intended for exhibition or other exceptional purposes.

The Act comes into operation by Order-in-Council on April 1, 1923, or on such previous date as the Order may appoint.

CATTLE EXPORTERS' CONFERENCE

Towards the end of January, 1923, a conference was held between the officers of the Live Stock Branch of the Federal Department of Agriculture and representatives of the stockyards, abattoir companies, packing companies, live stock associations, and others, in connection with the export of Canadian cattle to Great Britain following the removal of the cattle embargo. The subjects under discussion had reference to the development of a permanent export trade, including the establishing of facilities at ocean ports and of union stockyards at Montreal and other central points; the question of land and ocean freight rates, and other matters that have been engaging the attention of the officers of the Department since the removal of the restrictions referred to.

Those present were:—

J. J. Morrison, Toronto.
 F. S. Fulthorpe, Toronto.
 Geo. Rountree, Toronto.
 Mr. Ferguson, Toronto.
 A. Talbot, Toronto.
 E. Maybee, Toronto.
 F. Collyer, Winnipeg.
 H. Talbot, Winnipeg.
 A. Muir, Winnipeg.
 Duncan Campbell, Montreal.
 Donald Munro, Montreal.
 E. J. Coughlin, Montreal.
 Dr. J. H. Grisdale, Ottawa.
 H. S. Arkell, Ottawa.
 D. M. Johnson, Ottawa.
 P. E. Light, Ottawa.
 L. L. Cooke, Ottawa.
 R. S. Hamer, Ottawa.

The following resolutions were adopted.

Moved by E. Maybee and seconded by H. Talbot that the handling of space for export cattle shipments and arrangements for transportation be placed with Messrs. Alex. Muir, Duncan Campbell, Donald Munro, E. J.

Coughlin, and further that the parties named co-operate with representatives from Live Stock Export Shippers' Committee in making negotiations with steamship companies. Further that representatives of this committee be as follows: One from Western Canada, one from Eastern Canada, one from the Federal Department of Agriculture. The naming of the committee to be left to the Chairman of the Conference.

Moved by Geo. Rountree and seconded by Mr. Ferguson that all transportation matters be referred to the committee mentioned in the foregoing resolution.

Moved by Mr. Munro and seconded by Mr. Collyer,—

"Whereas the existing scattered system of stockyards established by the different railways at their terminal points at the extreme ends of the city of Montreal where markets are held simultaneously, is inadequate and detrimental to the interests of live stock producers using these yards, as well as to the consuming public, thus imposing a heavy and unnecessary burden of expense on both, without giving adequate compensating returns; and

"Whereas the port of Montreal is the principal export outlet in the Dominion for agricultural products, and as live stock already forms a large part of the country's exports and in the future will form a larger part, modern centralized accommodation for the efficient and economical handling and marketing of live stock passing through these yards for home consumption, or for export, is an urgent necessity;

"Be it resolved that in order to remedy the existing defects this meeting of exporters and the representatives of the live stock producers do hereby endorse the action of the Minister of Agriculture in appointing a

committee to report on the advisability of establishing union stockyards at or near Montreal, and desires to place itself on record as being impressed with the urgent necessity of the immediate construction of such yards, and recommends that the costs of construction should be borne by the transportation companies interested, with the control and operation vested, as in St. Boniface, in representatives of those corporations and a

nominee of the Provincial Government."

Moved by Mr. H. Talbot and seconded by Mr. Morrison, that the Department be requested to make an effort to work out a system to be presented to Parliament for adoption at the next session which will influence and assist farmers in exporting a class of cattle such as may safeguard the permanent development of our cattle trade.

REPORT OF THE SPECIAL COMMITTEE ON FAIRS AND EXHIBITIONS

The Dominion Minister of Agriculture, Honourable W. R. Motherwell, recently appointed a committee for the purpose of enquiring into the matter of Federal assistance to agricultural exhibitions, and as to the manner in which their usefulness might be increased and made a factor in the development of the live stock industry of Canada. The committee consisted of the Deputy Minister of Agriculture, Dr. J. H. Grisdale, the Live Stock Commissioner, Mr. H. S. Arkell, and Messrs. D. T. Elderkin, Regina; F. L. Fuller, Truro; S. E. Francis, Sherbrooke; and G. Morrisset, Quebec.

The conference was presided over by Dr. Grisdale. At its conclusion the committee presented to the Minister the following report:

"Your committee appointed to investigate the possibilities of increasing the usefulness of the agricultural exhibitions in Canada begs to report as follows:

The Committee held its first meeting at Brandon, Man., on Tuesday, December 12, 1922, with Dr. J. H. Grisdale as chairman and Mr. H. S. Arkell as secretary, Messrs. D. T. Elderkin, Regina, Sask., and S. E. Francis, Sherbrooke, Que., sitting on the committee. Mr. F. L. Fuller,

Truro, N.S., was unable to be present. This meeting was very representative of Western Canada as there were present the Deputy Minister of Agriculture for each of the Prairie Provinces, the Live Stock Commissioners for all four provinces, and delegates from the Exhibition Associations at Brandon, Regina, Calgary, Edmonton, Vancouver, and New Westminster.

A further meeting was held at Ottawa, on Thursday, January 4, 1923, with Dr. J. H. Grisdale as chairman, and Mr. H. S. Arkell as secretary. All members of the committee were present, viz: D. T. Elderkin, S. E. Francis, F. L. Fuller, and G. Morrisset representing the French-speaking Canadian Fairs. Representatives of the leading fairs and exhibitions in Eastern Canada were present, together with the Deputy Ministers of Agriculture of the Provinces of Ontario and New Brunswick.

In addition to the suggestions made at these two meetings there were placed at our disposal by the various Fair Associations the latest copies of their prize lists, catalogues, auditors' reports, and statements giving the amounts of prize money offered and paid, and numbers of entries for each breed of live stock.

As a result of the information gathered, your committee submits the following conclusions:

(1) Exhibitions having been in continuous operation in Canada for upwards of half a century and having increased in popularity from year to year, may be considered to have become permanent institutions of the people. Believing the agricultural exhibitions are most valuable mediums through which information may be disseminated, no effort should be spared to bring home to exhibition visitors the lessons they should learn in order to make agriculture more profitable to those engaged in this basic industry.

(2) As there are in each province one or more exhibitions which are interprovincial in their scope and, as such merit financial assistance from the Federal Government, this assistance might be offered under more stringent conditions than have obtained in the past. The larger part of the grant should be devoted to the encouragement of the live stock industry, and we recommend that it should be used to supplement the prizes offered for such breeds as are particularly suited to the province in which the exhibition is held. Believing that at this period it would be an economic waste to encourage the multiplication of live stock that has not proved its worth, there should be selected at each exhibition three breeds each of heavy horses, other than draft horses, and swine; six breeds of cattle, five of sheep and ten varieties of poultry. The breeds and varieties to be selected as hereinafter provided, on the understanding that those named shall be the ones most worthy of encouragement because of their value to the live stock industry. More breeds than the numbers referred to may be included in any prize list, but the amount offered for competition among these breeds or varieties shall in no case equal the

amount offered for the favoured breeds.

(3) It is recommended that a portion of the Federal grant, supplemented by funds from any other source, should be devoted to prizes for commercial classes of live stock, educational live stock exhibits and demonstrations in the interests of the live stock industry, and to boys' and girls' work, including live stock classes, judging competitions and other educational features.

(4) That visitors should be encouraged to take more interest in the exhibits and live stock judging, and to this end Associations should be urged to supply suitable accommodation for the public at the judging rings, to make the live stock stables and surroundings more attractive, to display prize cards giving information as to class, section and owner above each prize winner, and to issue and distribute a catalogue of the live stock department.

(5) The question of augmenting prizes in the case of large classes was considered, and it was apparent that no system should be adopted which would unduly increase the prize moneys that the fair would be obliged to pay. The justice is noted, however, of recognizing by increased money large numbers of exhibits. How this may best be done is not now apparent, but should be referred to the individual association for further consideration and experiment with a view to determining a permanent policy.

(6) There is need for greater care in the selection of live stock judges and for more uniformity in their work. These difficulties may be lessened with the co-operation of the Breed Associations. We would recommend that each of the large Breed Associations be asked to appoint a small special committee to compile a select list of qualified judges for their respective breeds, and

that those so selected should be invited to attend the next Royal Winter Fair, where they will be required to spend a stated time together studying the live stock exhibited, comparing ideas as to type, conformation, etc., and arriving at as nearly as possible a fixed standard of judging. Were this done every year with different men, it would not be long before the breed associations would have a list of judges that they could confidently recommend to exhibition associations. We further consider it desirable that the breed committees prepare for each province a list of prospective judges at exhibitions in their own province, thus training them to qualify as judges for the smaller exhibitions and gradually working up to the principal judges at the large exhibitions. It is, in our opinion, very desirable that the Federal Government should continue its present policy of assisting the associations to secure judges for live stock and poultry, but that this assistance be confined to judges recommended in cases where a breed association has carried out the aforementioned plan. Should any exhibition association deem it advisable to take upon itself the responsibility of securing judges they should be permitted to do so on the understanding that Federal aid for such judges will be withheld.

(7) That the working out of the general details of the policy as above suggested, viz: selection of favoured breeds, decision as to what commercial classes are to be included at individual exhibits, arrangements for demonstrational features, boys' and girls' work, etc., should be referred to a provincial or interprovincial committee, consisting of representatives of the provincial governments, agricultural colleges, exhibition associations and other organizations interested, to be convened at a suitable date by a representative of the Federal Department of Agriculture.

(8) It is considered that the practical working out of these plans can be best secured by holding another meeting of the representatives of exhibition associations next fall after these plans have been tried out for a season, and that the Minister of Agriculture should be requested to arrange for such a meeting in due course.

(9) It has been suggested that a Federal Association of Fairs and Exhibitions should be organized, and we recommend that consideration of this matter should be postponed until the above-mentioned convention.

In conclusion we wish to refer to the splendid unanimity of opinion expressed by all those present at the meetings, that this is an opportune time to bring our exhibitions into a closer relationship with the efforts of the Federal Department of Agriculture, and also to the desire of all the representatives to feature the educational in their exhibitions to the limit of their power.

Your committee also desires to express their appreciation of the action of the Federal Department of Agriculture which has made possible this investigation, and has, we believe, inaugurated a new era in the history of Agricultural Associations.

The encouragement thus offered will, we are confident, have far-reaching effects, and we present the preceding report as a comprehensive summary of the opinions held by the most representative of those interested in the development of agricultural activities in the Dominion of Canada.

Respectfully submitted,

J. H. GRISDALE,
Deputy Minister of Agriculture,

H. S. ARKELL,
Live Stock Commissioner,

D. T. ELDERKIN,

F. L. FULLER,

S. E. FRANCIS,

G. MORRISSET.

ADVISORY SEED BOARD MEETING

THE provisional Advisory Seed Board met in Ottawa on the 23rd of January to consider and recommend a revised draft of the Seed Control Act to present to Parliament at the session of 1923. There were present six representatives of the seed trade, namely, Messrs.—

E. F. Crossland of the Steele Briggs Seed Co., Toronto, Ont.

Col. W. H. Bruce of John A. Bruce and Co., Hamilton, Ont.

Kirby White of the D. M. Ferry Co., Windsor, Ont.

Wm. Ewing, Wm. Ewing Co., Montreal, Que.

A. E. McKenzie, of the A. E. McKenzie Co., Brandon, Man.

Hector L. Dery, of Dery Seed Co., Montreal, Que.

and six representatives of agricultural and horticultural growers, namely, Messrs.—

H. G. L. Strange, Fenn, Alta.

Stewart Corner, Kenora District Cooperative Clover Seed Growers' Assn., Oxdrift, Ont.

Frank Lewis, Burford, Ont.

Walter J. Cook, Ontario Vegetable Growers' Association. Camille Legare, vegetable growers, Montreal, Que.

W. H. McGregor, Miscouche, P.E.I., could not reach Ottawa and Mr. T. G. Raynor of the Seed Branch Staff acted in his stead.

Others were present and took part in the discussion but did not vote.

In drawing up the new Seeds Bill, a first draft was made at the Seed Branch headquarters embodying the principles of advanced seed legislation in other countries to protect

Canadian agriculture, as well as including the provisions and making changes found advisable in the administration of our Seed Control Act over a period of sixteen years. This first draft of the proposed Seeds Bill was submitted to conferences of the Seed Branch staff and District Inspectors and the Canadian Seed Trade before revising to present to Agricultural Associations at the meeting of the Advisory Seed Board.

Provisions recommended by the Board require the grading of clovers, grasses, including lawn grass, seed grain and fodder seeds and the testing and grading of these seeds at a Seed Laboratory or by a Seed Inspector, and either the grading of field root and vegetable seeds or the labelling with the percentage of germination when such percentage is below the minimum percentage of germination fixed by regulation.

Two very important new clauses were introduced by the seed trade and approved. They will require that any new kind or variety name that is not generally employed in Canada for that particular kind or variety during the year ending March 31, 1923, may not be used until it has been licensed by the Minister, who will appoint some person or persons to make propagating tests and issue certificates of their determination to the inspectors. The other clause forbids any person falsely to represent the quality, character, nature, variety or description of seeds or plants of any kind or variety. There were other minor changes made in the draft of the Bill.

REPORT OF THE ONTARIO AGRICULTURAL DEVELOPMENT BOARD

DURING the year ending October 31, 1922, the first year of operation, more than 4,000 enquiries and 1,191 formal applications for loans were received by the Agricultural Development Board of the Province of Ontario. Of this number 458 were granted and 178 are still under consideration. It is evident from the large number not granted that many applicants could not qualify for loans under the terms of the legislation. It must be remembered, that for the first half of the present fiscal year, the Board did not have authority to grant loans for the removal of encumbrances, as is now the case under legislation of last session. On this account, many applications could not be granted. In a few cases, applications were made for loans for the purposes set forth in

the Act, but before the money was paid over, it was found that it was really to be used for other purposes outside the Act. Such loans were immediately cancelled. It is of interest to note the manner in which the loans issued were distributed among the purposes set forth in the Act, which was as follows:

	Per cent.
Purchase of land.. . . .	47
Erection of Buildings.. . .	14
Settling Estates.. . . .	8
Discharge of Mortgages.. .	25
Drainage.. . . .	6

From these figures it is evident, states the report, that this new system of rural credits is filling a real need in the agricultural life of the province.

CONFERENCE ON THE CONSERVATION OF WILD LIFE

A Round Table Conference of Federal and Provincial game officials was held at Ottawa in December last. This was under the auspices of the Canadian National Parks, and is the first convention of its kind ever held in Canada.

Those present were: J. B. Harkin, Commissioner, Canadian National Parks, O.S. Finnie, Director of Northwest Territories and the Yukon, G. P. MacKenzie, Gold Commissioner for the Yukon Territory, J. A. Knight, Commissioner of Forests and Game for Nova Scotia, L. A. Gagnon, Chief Game Guardian for New Brunswick, Benjamin Lawton, Chief Game Guardian for Alberta, F. Bradshaw, Chief Game Guardian for Saskatchewan, J. H. Evans, Deputy Minister of Agriculture for Manitoba, D. McDonald, Deputy Minister of

Game and Fisheries for Ontario, J. A. Bellisle, Chief Game Guardian for Quebec, C. C. Parker, representing the Department of Indian Affairs, Hoyes Lloyd, Supervisor Wild Life Protection, Harrison F. Lewis, Chief Federal Migratory Bird Officer for Quebec and Ontario, R. W. Tufts, Chief Federal Migratory Bird Officer for the Maritime Provinces, Norman Criddle, Dominion Department of Agriculture, J. W. Coffey, District Inspector of Game and Fisheries for Ontario, I. Heckt, Game Inspector for the Province of Quebec, Dr. Seymour Hadwen, of the Northwest Territories Branch, Arthur Gibson, Dominion Entomologist, Lieutenant-Colonel C. Starnes, Assistant Commissioner of the Royal Canadian Mounted Police, Dr. R. M. Anderson, Chief of the Biological Division,

Department of Mines, Professor E. E. Prince, Dominion Commissioner of Fisheries, P. A. Taverner, Ornithologist, Department of Mines, Mrs. Elizabeth Hewitt, Convener, Conservation Committee, National Council of Women, and others.

The conference was opened by an address of welcome, which was delivered by Hon. J. H. King, Minister of Public Works. Mr. King referred to the potential value of Canada's wild life and the obvious reasons for conserving it.

The proceedings of the conference were marked by a splendid spirit of co-operation, and all the resolutions adopted were adopted unanimously. These resolutions dealt with many important matters, such as, a Dominion wide educational campaign in the interest of wild life conservation, general prohibition of the sale of game, uniform adjustment of the "bag limit" for Canada and the United States, federal assistance for the Provinces in controlling illegal shipments of game and fur, a gun license system for all hunting, alter-

ation of present open and closed seasons for several species of birds, and protection of marine mammals.

The problem of controlling the wolf and coyote menace in the West, was thoroughly discussed and the opinions of those taking part in the discussion were frequently at variance, but many helpful suggestions and interesting points were divulged.

It was obvious at the conference that both the Provinces and the Dominion realize their distinct responsibilities in the matter of the guardianship and development of Canada's wild life resources, and that with intelligent conservation and utilization there is no reason why this natural asset should not be preserved and constitute a perpetual source of profit. It was felt that conditions in other countries are such that, at least insofar as big game is concerned, Canada is destined to soon enjoy a practical monopoly on this continent.

Mr. Arthur Gibson, Dominion Entomologist, presided over the sessions.

THE FINCH DAIRY STATION REPORT

In 1922 the patrons at the Finch Dairy Station were paid over \$20,000 in excess of what they would have received if they had been paid at the average rate received by patrons of cheese factories. This advantage comes partly from the fact that the Station is equipped to make butter or cheese and to sell milk or cream according to the best market offering. Every factory is not so well located as Finch, and it is not pretended that the experience at the Finch Station should be duplicated in every case; but there are many places where

larger factories could be built up and a better market secured by equipping them along the same lines. The Station is operated as a demonstration by the Dairy Branch of the Federal Department of Agriculture. It shows a handsome profit on the year's business, and is an outstanding example of a well managed Government institution.

The following statement shows the quantity of milk received month by month and the disposal of same at the Finch Dairy Station for the calendar year 1922:

THE AGRICULTURAL GAZETTE OF CANADA

BUSINESS OF THE FINCH DAIRY STATION, 1922

Month	Milk Received	Cheese Manfd.	Milk Sold	Fat in Cream Sold	Butter Manfd.	Net Price per 100 lbs. Milk to Patrons
	lb.	lb.	lb.	lb.	lb.	\$
Jan.....	219,838			8,744		1.75
Feb.....	245,980			9,019		1.61
Mar.....	645,955			17,925	4,787	1.36
Apr.....	632,973			17,195	4,185	1.33
May.....	904,431		4,125	22,870	8,792	1.19
June.....	1,116,794	4,460		24,759	14,818	1.30
July.....	1,162,109	1,580		33,293	4,373	1.31
Aug.....	1,161,783	705		33,082	6,286	1.30
Sept.....	1,042,075	10,280		27,930	3,244	1.31
Oct.....	778,070	22,388		18,140	2,966	1.68
Nov.....	469,369	5,911	14,000	16,177	938	2.24
Dec.....	402,502		8,000	16,655		2.09
	8,781,879	45,324	26,125	245,789	50,389	1.43

The net value of the milk per 100 pounds varies from month to month according to the proportion of the milk disposed of in different ways. The total receipts of milk (8,781,879 pounds) are over four times as much as were received during the year 1912 (2,069,281 pounds), which was the first year of operation.

An addition to the building was completed during the year to enable the factory to handle the constantly

increasing supplies of milk. The management find themselves now in this difficulty, that patrons from surrounding factories are clamouring to be admitted to Finch, and the usual complaint of a Government institution operating against private enterprise is raised by the owners of other factories, although the patrons at Finch derive no benefit from the fact that it is a government institution.

DOMINION EDUCATIONAL CHEESE SCORING CONTEST

A New Service

In addition to the Dominion Educational Butter Scoring Contest, which will be conducted this year on the same conditions as last year, the Dominion Dairy and Cold Storage Commissioner has this year established a Dominion Educational Cheese Scoring Contest.

1. The contest will cover six months from May to October inclusive.

2. The samples (a full or half-sized Cheddar cheese) must be made between the 1st and 10th of each month and shipped by express (charges collect) to the Dairy and Cold Storage Commissioner, c/o Harbour Cold Storage, Montreal, P.Q.,

to arrive on or before the 20th of each month.

3. The provincial dairy authorities will be asked to select the cheese factories for the contest each month, according to the following allotment:

Prince Edward Island, 1 factory each month.

Nova Scotia, 1 factory each month.

New Brunswick, 1 factory each month.

Quebec, 4 factories each month.

Ontario, 4 factories each month.

Manitoba, 1 factory each month.

Saskatchewan, 1 factory each month.

Alberta, 1 factory each month.

THE AGRICULTURAL GAZETTE OF CANADA

British Columbia, 1 factory each month.

Different factories to be selected each month.

4. Blank manufacturing record forms and full shipping instructions will be mailed from Ottawa to each factory participating in the contest.

5. The cheese will be scored a few days after arrival in Montreal. Copies of the manufacturing records and scores will be mailed to every cheese factory in Canada.

6. The Department will pay for the cheese at current market price at the time of shipment.

THE DIRECTOR OF EXPERIMENTAL FARMS AND THE DOMINION ANIMAL HUSBANDMAN TO VISIT GREAT BRITAIN

The principal object of the proposed visit of the Director of Experimental Farms, Mr. E. S. Archibald and the Dominion Animal Husbandman, Mr. G. B. Rothwell, to Great Britain is to attend the London Shire Show, the greatest heavy horse show of its kind in England. They will also visit one or two other prominent winter shows and will make a selection of the Shire horses being donated by the Shire Horse Association to the Dominion Government.

These officers will also carefully examine some outstanding herds of Yorkshire and Tamworth swine in the Old Country, with a view to making an importation of these for placing on the Dominion Experimental Farms System. In view of

the present status of the bacon industry in Canada and the fact that many of the Yorkshire herds on the Experimental Farms are seriously handicapped in further constructive breeding work owing to lack of a sufficient number of high class boars of outstanding breeding and type, it is thought that this importation of a number of choice boars and a few sows will materially strengthen the breeding work on the Experimental Farms and render excellent service to the breeders of bacon hogs through the distribution of young breeding stock thus made possible.

It is also intended to make a small importation of breeding rams of several of the breeds already established on the Experimental Farms.

THE CREATION OF THE DIVISION OF BACTERIOLOGY AT THE EXPERIMENTAL FARM

The Division of Bacteriology of the Experimental Farms Branch, just recently formed, has for its object the carrying out of bacteriological investigations connected with the research work of several other divisions on the Central Farm, in addition to such independent investigations as may be found desirable from time to time. One great need for this division is in connection with work in dairy bacteriology and with the health of animals from the point of view of stable sanitation. There is

also a wide field for work in connection with the bacteriology of soils and fertilizers as well as many problems in connection with poultry work. In fact, there are few, if any, divisions of the work in the Experimental Farms Branch where problems in bacteriology do not press for solution. The Division of Bacteriology, then, while not infringing upon, or duplicating, the work now carried on in the Plant Pathological Laboratories, will work in the closest co-operation with all other features of the Experimental Farm activities.

THE AGRICULTURAL GAZETTE OF CANADA

THE GIFT OF CERTAIN BREEDING ANIMALS TO CANADA BY THE BRITISH SHIRE HORSE ASSOCIATION

The British Shire Horse Association has felt that their field for the sale of breeding stock was not as wide as it might very properly be, and that there were parts of Canada where the breeding of heavier draft horses would be advisable, and that, to attain this end, the use of Shire blood would seem to be warranted. The Duke of Devonshire on several occasions has spoken very forcefully on this matter, and as a result the British Shire Horse Association made an offer to the Canadian government to present to Canada two choice Shire stallions and three in-foal mares, these animals to be located on one of the Dominion Experimental Farms.

This is an excellent manner of bringing to public attention the merits of the Shire horse, and is sure to be appreciated by the people in Canada interested in horse breeding even though many of them may be strong supporters of other breeds. There is no doubt that the present critical condition of the horse-breeding industry in this country is due, not so much to any congestion of heavy horses as it is to the accumulation of lighter animals less suited to heavy draft work. The trying out of the Shire horse, therefore, with this end in view, as well as the continuation of breeding work with other heavy classes, should do something to stimulate the breeding of heavier and more profitable types.

WILL INVESTIGATE DAIRYING IN AUSTRALASIA

Mr. J. A. Ruddick, dairy commissioner for Canada, and Mr. W. A. Wilson, manager of the Saskatchewan Co-operative Creameries, and president of the Canadian Produce Dealers Association, have been appointed by the Federal Government to study the dairy industry in New Zealand and Australia. They left Vancouver on January 26, and are spending four or five weeks in New Zealand, and about a fortnight in Australia. Subjects outlined for study include milk production, manufacturing of both butter and cheese, and the system of grading, marketing and shipping.

In the announcement of the appointments it is stated that a study of the status of Canadian dairy products on the British market points to the need for prompt and energetic action if Canada is to make any progress on the British market or even if she is to hold her own.

The New Zealand system of grading dairy products has been for the

last few years followed in the Prairie Provinces, with the result that butter from those provinces, until recently a negligible commodity of rather poor repute, is now of primary importance and commands a higher price on the British market than that from any other part of Canada. With the general introduction into Canada of this grading system and the application of some of the other methods that have helped make New Zealand and Australian dairy products famous, there would seem to be no reason why this country should not regain her former ascendancy on the British market. This desired end, however, can be secured only by following the best known dairy practices with the sympathetic co-operation of the dairymen of Canada.

CANADIAN NATIONAL POULTRY RECORD ESTABLISHED

Under The Live Stock Pedigree Act, incorporation has been granted by the Dominion Minister of Agriculture to the Canadian National

Poultry Record Association, an organization formed for the purpose of providing registration for hens that qualify under the conditions laid down by the Association and approved by the Department of Agriculture.

The conditions of registration are, in brief, that the bird shall be pure bred, typical of the breed, free from standard disqualifications, with a record of 200 two-ounce eggs in a period of 52 consecutive weeks secured at an official Egg-laying Contest.

Birds and their progeny conforming to the requirements will be accepted for registration by the Canadian National Live Stock Records, in the same manner as other classes of live stock.

INTERNATIONAL GRAIN AND HAY SHOW— CANADIAN AWARDS

At the International Grain and Hay Show held at Chicago, Ill., in December, 1922, the Canadian winnings were as follows:

In the class for Hard Red Wheat open to the world, Canada won first and second prizes, Mr. R. O. Wyler of Luseland, Sask., winning the sweepstakes. Out of the first thirty-five placings in this class, Canada won nineteen made up as follows: Alberta 8; Saskatchewan 9; Manitoba 2.

In the barley (two-rowed class) Canada was first with Mr. Nick Taitinger of Claresholm, Alta., winning the first prize. Canada received three placings out of nine.

In the class for oats open to the world, Canada was first and second, Mr. J. W. Biglands, of Lacombe, Alta., winning first prize. In this class Canada received twenty-four out of thirty-five placings made up as follows: Alberta 13; Saskatchewan 7; Manitoba 2; Prince Edward Island 1; and Ontario 1.

In the alfalfa seed class, Canada was second and third, and won six out of the sixteen placings. It is perhaps worthy of note that all six persons winning placings from Canada were from Brooks, Alta.

GRADUATE SCHOLARSHIPS IN AGRICULTURE

In order to assist and encourage scientific agriculturists to better equip themselves for research work through specialist training, the Canadian Society of Technical Agriculturists announces that it will establish a number of graduate scholarships in 1923. As a beginning, it is proposed to offer five scholarships of at least five hundred dollars each, the number to be augmented as circumstances permit.

The Society will appoint a Board of Trustees for the administration of the Graduate Scholarship Fund. This board will undertake to secure donations to the Fund. A Credentials Committee charged with the selection of applicants will also be appointed. The conditions under which the proposed scholarships will be granted have not yet been announced.

LANTERN SLIDES FOR FARMERS' CLUBS

Farmers' clubs desiring to borrow sets of coloured lantern slides for use at their evening meetings may obtain them from the Natural Resources Intelligence Branch, Department of the Interior. The service is entirely free, express charges being paid both ways by the Department. Sets of slides may be borrowed for periods not exceeding two weeks and longer by special arrangement. As during the autumn and winter months the demand for slides is heavy it is desirable that requests should be made well in advance of proposed meetings. The following is a list of the sets available at present:

THE AGRICULTURAL GAZETTE OF CANADA

1. Canada, Coast to Coast.	80
2. Rural Canada (Agriculture) Part 1, Eastern Canada.. . . .	58
3. Rural Canada (Agriculture) Part 2, Western Canada.. . . .	63
4. The Resources of Nova Scotia and Prince Edward Island.. . . .	63
5. The Buffalo.. . . .	60
6. The Resources of New Brunswick.. . . .	66
7. The Resources of Quebec.	47
8. The Resources of Ontario.	78
9. The Resources of Manitoba.. . . .	58
10. The Resources of Saskatchewan.. . . .	85
11. The Resources of Alberta.	75
*12. After "The Last West" What?.. . . .	44
*13. Canada's Industrial Backbone (Agriculture).. .	43
*14. Hitching Waggon to a Star (Hydro-electric energy).. . . .	43
*15. What We Owe to our Forests.. . . .	46
16. The Resources of British Columbia.. . . .	59
17. A set of slides on Canadian Scenery, with appropriate titles but no lecture.. . . .	57
18. Indians of Western Canada (Descriptive titles but no lecture).. . . .	67
19. Lumbering in Canada.. .	64
20. Pulp and paper industry.. .	—

Specially prepared lectures or lecture notes accompany the several sets.

The slides marked "*" are English size, 3¼-inch x 3½-inch.

The slides not marked are American size, 3½-inch x 4.

American size sets contain from 60 to 80 slides.

INTERNATIONAL CONGRESS ON CATTLE BREEDING, 1923

From August 29 to September 4, 1923, an International Congress on Cattle Breeding will be held at The Hague.

The purpose of this Congress is to bring together the leading persons of the various countries, government officials, scientific investigators, the leaders of organizations, as well as leading men of experience in the sphere of cattle breeding and agriculture.

The Congress will open up an opportunity for an exchange of views concerning subjects in the sphere of cattle breeding that may be considered, at the present time, as attracting the full attention of all who, owing to their work, are connected with the question of cattle raising.

The papers that will be read will furnish interesting and important particulars concerning these subjects.

A great number of countries have already promised official co-operation, while it is also certain that papers will be written by several of the most distinguished persons in the sphere of cattle breeding.

Membership gives admission to all the meetings, to participation in all the excursions and the receiving of all publications, gratis. From the latter, one comes into possession, as a member, of important contributions to the knowledge of the questions with respect to cattle breeding which may be considered as being, at the moment, the centre of interest.

THE AGRICULTURAL GAZETTE OF CANADA

Associations that become members of the Congress may nominate one or more delegates, with the understanding that for each delegate a membership contribution is due. That contribution has been fixed at 12 guilders.

Associations or private persons, who are able to do so, are invited to

support the Congress financially by becoming donors. Donors contribute a sum of at least 100 guilders and have the same rights as members, though an association that becomes a donor, is able to nominate two delegates.

The secretary is H. G. A. Leignes Bakhoven, Leeuwarden, Holland.

NEWS ITEMS AND NOTES

It is announced that the World's Dairy Congress and Show, particulars of which were given in the previous number of the Agricultural Gazette, will be held at Washington, October 2 to 5. Full information may be obtained by delegates and visitors by communicating with the World's Dairy Congress Association, 426 Star Building, Washington, D.C., U.S.A.

The Dominion Department of Agriculture has taken a further step towards the eradication of tuberculosis in cattle. By an Order in Council of December 11, 1922, eradication by prescribed districts will be undertaken by the Health of Animals Branch. The Department is prepared to apply quarantine to restricted areas on the request of a provincial government, and to test cattle for the disease. The quarantine will be applied, insofar as bovine tuberculosis is concerned, under such conditions as will prevent contact with cattle from outside. Owners of the cattle within the area will be required to assist the veterinary inspectors by giving such help as may be reasonably demanded. Testing will be performed by accredited veterinarians. Compensation up to two-thirds the appraised value will be paid for such reactors as are destroyed. Provision is made for saving for breeding purposes valuable animals that react to the test by segregation under what is known as the "hang system," this being virtually a quarantine from which only the newly born calves may be saved and returned to the healthy herd.

Pursuant to the application of the Minister of Agriculture of the Province of Manitoba, the municipalities of Dufferin, Thompson and Roland have by proclamation been set apart as a restricted area for the eradication of bovine tuberculosis under the provisions of The Animal Contagious Diseases Act.

A modification of policy in the accredited herd system instituted for the eradication of tuberculosis in pure-bred cattle, is announced by the Veterinary Director General. In the case of the owner of a herd fully accredited or in process of accreditation adding to his stock, the practice has been to test animals on the vendor's premises and to institute an officially conducted quarantine for sixty days on the premises of the buyer pending a retest. Commencing with January 1, 1923, the buyer will be required to assume responsibility for the careful isolation and practical quarantine of the animals during the sixty day period. They will then, as before, if they pass the test be admitted into the herd.

It has been definitely decided, announces the Dairy and Cold Storage Commissioner, that the regulations relating to the grading of Canadian dairy produce for export will be put in force on April 1, 1923. After that date all butter and cheese intended for export will be graded. The regulations require that every factory shall mark the vat number on every cheese and cheese box, and the churning number on every box of butter.

An arrangement has been made with the authorities in the three provinces of Alberta, Saskatchewan and Manitoba to have one or more of the provincial butter graders in each of these provinces appointed as Dominion Dairy Produce Graders after the first of April next, when the complete system of grading for export will be put in force. These graders will be available to grade any butter being exported direct and they will be paid by fee according to the number of packages graded. It is expected that one grader will be named at each of the following provincial grading stations, namely, Winnipeg, Regina, Saskatoon, Calgary and Edmonton.

THE AGRICULTURAL GAZETTE OF CANADA

Geo. H. Barr, Chief, Dairy Division of the Dairy and Cold Storage Branch, and John Scott, Ontario Butter Grader, conducted a butter-grading competition at the annual convention of the Creamery Association held in Toronto December 12. These competitions are popular and instructive and will be continued for both cheese and butter as suitable occasions arise.

The dairying industry of Manitoba has shown a marked development during the past few years. Out of 51,000 farmers in the province, there are now 26,000 producing and shipping milk and cream. Immediately prior to the war Manitoba was an importer of dairy products, seventy carloads of butter being brought into the province in 1914; to-day her exports total 100 carloads annually.

Alberta's creamery butter production for 1922 exceeds 15,000,000 lbs., an increase of over two million pounds over 1921.

The new Dairy Building at the Ontario Agricultural College, Guelph, was officially opened by the Provincial Minister of Agriculture, the Hon. Manning Doherty, on January 9, 1923. The new building will be fully equipped with the most modern machinery to admit of adequate instruction being given in all branches of dairying,

including the manufacture of butter, cheese, ice-cream, and powdered and condensed milk.

Arrangements have been made through the Department of the Interior—which administers the Migratory Bird Convention Act—for the extension to Canada of the work of the National Association of Audubon Societies. A number of provincial educational departments have agreed to co-operate with the Dominion authorities in the formation of Junior Audubon Clubs in the schools. A considerable extension of the number of members in the junior organization throughout Canada is looked for.

In order to allow Bachelors of Agriculture of the Province of Quebec to take advantage of a post graduate course established by Macdonald College, Ste. Anne de Bellevue, the Hon. Mr. Caron, Minister of Agriculture, has granted three scholarships, which will be placed at the disposal of the year graduates and previous years' graduates of each of the following agricultural schools: Macdonald, Oka and Ste. Anne de la Pocatière.

Mr. Walter M. Stewart, president of the firm of W. C. Macdonald, Registered, Incorporated, of Montreal, has also granted two scholarships: one for a graduate of the Oka Agricultural Institute, and the other for a graduate of the School of Agriculture of Ste. Anne de la Pocatière.

APPOINTMENTS AND STAFF CHANGES

Mr. L. H. Newman, Secretary of the Canadian Seed Growers' Association, has been appointed Dominion Cerealists to fill the vacancy caused by the resignation of Dr. Chas. E. Saunders.

Mr. Newman is a graduate of the University of Toronto and of the Ontario Agricultural College. He is widely known for his work with the Canadian Seed Growers' Association, and has been identified with experimental and practical agriculture for many years.

Dr. Allan Grant Lochhead, recently appointed Dominion Bacteriologist of the Experimental Farms Branch, Department of Agriculture, took his B.A. degree at McGill University in 1911, obtaining honours in chemistry, and his M.Sc. degree from the same institution in 1912.

From 1912 to 1914 he was engaged in post-graduate work in Agricultural Bacterio-

logy at the University of Leipsic, Germany, under Prof. F. Löhnis, now of the Department of Agriculture, Washington. He passed his examinations and presented his thesis for the degree of Ph.D. at the University of Leipsic on July 29, 1914. In May of 1919, he was granted his Ph.D. degree by McGill University. For some time thereafter he lectured on bacteriology at Macdonald College, and then took up work as Research Bacteriologist with the Canadian Milk Products Company for about two years, after which he held a position as Bacteriologist Chemist with the Canadian Malt Products Company. Following this, he was appointed to the staff of the University of Alberta, where he has since been carrying on work in bio-chemistry.

Mr. R. L. Wheeler has been appointed to fill the vacancy in the position of Fruit Transportation Specialist, caused by the

THE AGRICULTURAL GAZETTE OF CANADA

promotion of Mr. George E. McIntosh to the office of Dominion Fruit Commissioner. Major Wheeler's military service comprised two years in infantry, two years as traffic officer and detachment commander of a military railway unit in France, followed by 18 months in 1919 and 1920 on the railway advisory staff of Generals Denikin and Wrangel, anti-Bolshevist leaders in South Russia.

Major Wheeler comes to the Fruit Branch from the operating Department, Canadian Pacific Railway, Winnipeg.

Mr. G. H. Berkeley, M.A. of the University of Toronto, has been appointed to succeed Dr. W. H. Rankin as Plant Pathologist-in-Charge of the field laboratory at St. Catharines, Ont.

Mr. Herbert Groh, B.S.A., who for the past two years has been in charge of plant disease inspection work in Manitoba, and

who was formerly, for some years, Assistant Botanist at the Central Experimental Farm, has been appointed to a position as Botanist, with headquarters at the Central Laboratory.

The development of the educational work to encourage a greater interest in the food value of dairy products, which is being conducted by the Dairy Branch under Miss Campbell's direction, has made it necessary to engage an assistant demonstrator and lecturer. Miss Marie Eveline LeBlanc, who has been appointed to the position, has had training in household science at St. Paschal Normal School and at Laval University, and acted as Superintendent of the Cercle de Fermieres, Quebec.

Mr. William Gibson, at one time Superintendent of the Federal Experimental Farm at Indian Head, has been named by the Provincial Department of Agriculture as Superintendent of the Government Farm at Oliver, near Edmonton.

ASSOCIATIONS AND SOCIETIES

WESTERN CANADIAN SOCIETY OF AGRONOMY

The Western Canadian Society of Agronomy held its third annual meeting at the University of Saskatchewan, December 27-29, 1922. This society was organized in 1919 to promote the agronomic interests of the Prairie Provinces. It now numbers sixty members, from Agricultural Colleges, Experimental Farms and Provincial Departments of Agriculture.

A field meeting is held every summer in addition to the annual winter meeting. At the latter a programme of technical papers is presented and discussed. These are later published in the annual volume of proceedings. Standing committees are maintained to promote specifically the interests of the following branches: field crop experimentation, soils investigations, crop and seed technology, plant breeding, plant pathology, instruction, and extension. The success of the Society in stimulating interest in the investigation of agronomic problems lying within these fields, is reflected in the increasingly high quality and varied nature of the papers presented, and in the activities of the standing committees as shown in their reports.

Professor G. H. Cutler, in his presidential address, attempted to measure the progress of agronomy in the Prairie Provinces in terms of end results, that is, in terms of the actual improvement in general farm practice which had resulted from agronomic investiga-

tion and instruction. This point of view was shared by many of the succeeding speakers. There was, in fact, a remarkable unanimity with regard to the necessity of relating professional work in agriculture directly to the farmers' needs, and making results count in actual farm practice.

The programme included the following papers: Address of Welcome by President W. C. Murray, University of Saskatchewan; Progress in Agronomy in Western Canada, G. H. Cutler, University of Alberta; Agronomy as a Subject of Instruction, L. E. Kirk, University of Saskatchewan; Winter-Hardiness Studies in Wheat, R. Newton, University of Alberta; The District Representative as a Link in Extension Service, N. C. Mackay, Manitoba Department of Agriculture; Soluble Nitrogen as a Limiting Factor in Crop Production at Grande Prairie, W. D. Albright, Dominion Experimental Farm, Beaverlodge, Alta.; Thirty Years of Cereal Investigations in North Dakota, H. L. Walster, University of North Dakota; Agronomic Conditions in Manitoba as Revealed by the Manitoba Survey, J. H. Ellis, Manitoba Agricultural College; Lethal Factors and Mutations in Cereals, W. P. Thompson, University of Saskatchewan; Potato Diseases, G. R. Bisby, Manitoba Agricultural College; The Milling Value of Saskatchewan Wheats, C. H. Goulden, University of Saskatchewan; Water Require-

THE AGRICULTURAL GAZETTE OF CANADA

ments of Crops, W. H. Snelson, Dominion Irrigation Experimental Station, Brooks, Alta.; Methods of Keeping Records of Cereal Breeding Investigations, J. B. Harrington, University of Minnesota; Experimental Methods with Special Reference to Uniformity of Descriptive Terms, G. P. McRostie, Central Experimental Farm, Ottawa; Soil Moisture Studies at the Dominion Experimental Farm, Swift Current, Saskatchewan, S. Barnes, Swift Current.

British Columbia Berry Growers' Association.—President and Manager, H. M. Eddie; Secretary-Treasurer, A. P. Peacock, Head Office, 103-5 Yorkshire Building, Vancouver, B.C.

Manitoba Horse Breeders' Association.—President, J. W. Reid, Brandon; Secretary, W. I. Smale, Brandon.

Manitoba Cattle Breeders' Association.—President, J. R. Hume, Souris; Secretary, W. I. Smale, Brandon.

Manitoba Sheep Breeders' Association.—President, John Strachan, Pope; Secretary, W. I. Smale, Brandon.

Manitoba Swine Breeders' Association.—President, Kenneth McGregor, Brandon; Secretary, W. I. Smale.

Veterinary Association of Saskatchewan.—Officers for 1923: President, Dr. N. Wright, Saskatoon, Sask.; Vice-President, Dr. J. M. Fawcett, Regina; Secretary-Treasurer and Registrar, R. G. Chasmar, V.S., Hanley, Sask.

Dairymen's Association of Eastern Ontario.—President, W. L. Newman, Lorneville, Ont.; 1st Vice-President, W. H. Olmstead, Leonard; Secretary, T. A. Thompson, Almonte; Treasurer, J. R. Anderson, Mountain View, Ont.

Quebec Pomological and Fruit Growing Society.—Hon. President, C. E. Petch; President J. R. Marshall, Abbotsford; Secretary Treasurer, Peter Reid, Chateaugay, Que.

Canadian Sheep Breeders' Association.—Secretary, R. Wade, Department of Agriculture, Toronto, Ont.

Entomological Society of Ontario.—Secretary, A. W. Baker, Ontario Agricultural College, Guelph, Ont.

Beekeepers' Association of British Columbia.—President, Lynn Browne, Vancouver; Secretary, John Brooks, 654 24th Avenue W., Vancouver, B.C.

United Farmers of Manitoba.—President, Colin H. Burnell, Oakville; Vice-President, D. G. McKenzie, Brandon; Secretary, W. R. Wood, Winnipeg.

Dairymen's Association of Western Ontario.—President, R. Johnston, Prince-town; 1st Vice-President, H. Mannell,

The University of Alberta was selected for the next annual meeting, and the following officers were elected for 1923: President, W. C. McKillican, Experimental Farm, Indian Head, Sask.; Vice-President, Manley Champ- lin, University of Saskatchewan; Secretary-Treasurer, J. D. Newton, University of Alberta. Committee: J. H. Ellis, Manitoba Agricultural College; W. D. Albright, Dominion Experimental Farm, Beaverlodge, Alta.

Woodstock; Secretary-Treasurer, Frank Herns, London.

Ontario Beekeepers' Association.—Officers for 1923: President, E. T. Bainard, Lambeth; Secretary-Treasurer, F. Eric Millen, Ontario Agricultural College, Guelph, Ont.

Maritime Beekeepers' Association.—Officers for 1923: President, H. G. Miller, Fredericton, N.B.; Secretary-Treasurer, E. D. Craig, Experimental Farm, Kentville, N.S.

Manitoba Potato Growers' Association.—Secretary, J. R. Almey, Agricultural Extension Service, Legislative Building, Winnipeg, Man.

United Seed Growers, Ltd., Penticton, B.C.—Secretary, F. W. King, Kaleden, B.C.

Maritime Poultry and Pet Stock Association.—President, S. E. McKie; Secretary-Treasurer, A. Vye Gibson, Moncton, N.B.

Dominion Bantam Association.—President, Victor Barber, Toronto, Ont.; Secretary-Treasurer, J. T. Isbell, 39 Woolfrey Ave., Toronto.

Ontario Beet Growers' Association.—President, H. J. French, Dresden, Ont.; Secretary-Treasurer, J. L. Dougherty, Chatham, Ont.

Canadian National Poultry Record Association.—President, Dr. Robert Barnes, Ottawa; 1st Vice-President, Dr. Sylvius Lafortune, Gatineau Pointe, Que.; 2nd Vice-President, Prof. M. C. Herner, Manitoba Agricultural College, Winnipeg; Secretary-Treasurer, Ernest Rhoades, Department of Agriculture, Live Stock Branch, Ottawa.

Central Canada Veterinarian Association.—President, Dr. G. Hilton, Ottawa; Vice-President, J. A. Bean, Winchester; Secretary-Treasurer, Dr. C. H. Weaver, Ottawa.

Ontario Agricultural Experimental Union.—Officers for 1923: President, Jack Baker, Hampton; Vice-President, Wm. Elliott, Galt; Secretary, Dr. C. A. Zavitz, Treasurer, A. W. Mason, O. A. C., Guelph.

Manitoba Ayrshire Breeders' Club.—President, Geo. Steele, Glenboro; Vice-President, Wm. Braid, Oak River; Secretary, Wm. Brown, Deloraine.

Acadian Entomological Society.—President, Wm. McIntosh, St. John, N.B.; Vice-

THE AGRICULTURAL GAZETTE OF CANADA

President, Dr. W. H. Brittain, Truro, N.S.; Secretary-Treasurer, A. B. Baird, Fredericton, N.B.

United Grain Growers Limited.—Secretary, R. L. Shaw, Winnipeg, Man.; Assistant Secretary, L. M. Gaetz, Calgary, Alta.

Western Grain Dealers' Association.—President, J. Thordarson; Secretary-Treasurer, D. O. McHugh, Calgary, Alta.

Western Canada Irrigation Association.—Secretary, James Colley, Lethbridge, Alta.

Okanagan United Growers, Ltd.—Secretary-Treasurer, W. J. McDowall, Vernon, B.C.

Ontario Association of Fairs and Exhibitions.—President, Jas. F. Ault, Winchester; 1st Vice-President, A. R. G. Smith, New Hamburg; 2nd Vice-President, James McLean, Richmond Hill; Secretary-Treasurer, J. Lockie Wilson, Toronto.

Quebec Society for the Protection of Plants and the Canadian Branch of the American Phytopathological Society.—A joint meeting of the above societies was held in the Biology Building of Macdonald College on December 7 and 8, 1922. The invited guest was Dr. Melville T. Cook, of the State University of New Jersey, who spoke on "The Past and Future of Plant Pathology."

The officers of the Canadian Branch American Phytopathological Society elected for the year were as follows: President, Professor W. P. Fraser; Vice-President, Dr. B. T. Dickson; Secretary-Treasurer, Dr. R. E. Stone.

It was decided to hold the next annual meeting of the Canadian Branch at Queen's University, providing the necessary arrangements can be made.

THE LIBRARY

LIST OF PRINCIPAL ACCESSIONS TO THE DEPARTMENTAL LIBRARY, INTERNATIONAL INSTITUTE BRANCH, DEPARTMENT OF AGRICULTURE.

David Lubin; a study in practical idealism, by O. R. Agresti, with a recollection of David Lubin by W. R. Thayer. Boston, Little, Brown and co. 1922. 372p.

Concealing-coloration in the animal kingdom; an exposition of the laws of disguise through color and pattern: being a summary of A. G. Thayer's disclosures, by G. H. Thayer. New York, Macmillan, 1918. 260p. il. coloured plates.

Wild oxen, sheep and goats of all lands, living and extinct, by R. Lydekker. London, Rowland Ward, Ltd. 1898. 318p. il. colored plates.

A text-book of zoology, by T. J. Parker and W. A. Haswell. London, Macmillan, 1921. 816, 714p. il. 2 volumes.

One thousand American fungi; how to select and cook the edible; how to distinguish and avoid the poisonous . . . by Charles McIlvaine and R. K. Macadam. Indianapolis, The Bowen-Merrill co. 1902. 729p. il.

The origin of a land flora; a theory based upon the facts of alternation, by F. O. Bower. London, Macmillan, 1908. 727p. il.

Histoire des legumes, par M. Georges Gibault. Paris, Librairie horticole, 1912. 404p. il.

A text-book of botany for colleges, by W. F. Ganong. New York, Macmillan, 1921. 624p. il.

Fritz Bahr's commercial floriculture; a practical manual for the retail grower, by Fritz Bahr. New York, The A. T. De La Mare co. 559p. il.

Tall bearded Iris, by Walter Stager. Sterling, Illinois, 1922. 262p. il.

History of transportation in the United States before 1860 . . . by C. E. MacGill and a staff of collaborators. Washington, Carnegie institution of Washing, 1917. 678p.

The technical control of dairy products; a treatise on the testing, analyzing, standardizing and the manufacture of dairy products, by Timothy Mojonnier, and H. C. Troy. Chicago, Mojonnier bros. co. 1922. 909p. il.

Hormones and heredity; a discussion of the evolution of adaptations and the evolution of species, by J. T. Cunningham. New York, Macmillan, 1921. 262 p.

Entomology with special reference to its ecological aspects, by J. W. Folsom. Philadelphia, P. Blakiston's son & co. 1922. 502p. il.

Animal parasites and human disease, by A. C. Chandler. New York, John Wiley & sons, 1922. 571p. il.

Rothamsted experimental station; reminiscences, tales and anecdotes of the laboratories, staff and experimental fields, 1872-1922, by Edwin Grey. 155p. il.

God's green country; a novel of Canadian rural life, by E. M. Chapman. Toronto, The Ryerson press, 1922. 287p.

Analysis of milk and milk products, by Henry Leffmann. Philadelphia, P. Blakiston's son & co. 1915. 113p.

Confectioners' raw materials: their sources, modes of preparation, chemical composition

THE AGRICULTURAL GAZETTE OF CANADA

he chief impurities and adulterations, their more important uses and other points of interest, by James Grant. London, Edward Arnold & co. 1921. 173p. il.

Orchard fruit tree culture, by F. J. Fletcher. London, Benn bros. Ltd. 1922. 73p. il. (Market nursery work, vol. 5).

Carnations and pinks, by F. J. Fletcher. London, Benn, bros. Ltd. 1922. 68p. il. (Market nursery, work, vol. 4).

Canada; commerce and natural resources. Ottawa, Dept. of the Interior, 1922. 195p. il.

Fungoid diseases of agricultural plants, by Jacob Erikson. London, Bailliere, Tindall and Cox, 1912. 208p. il.

Nutrition de la plante; utilisation des substances ternaires, par Marin Molliard. Paris, Librairie Octave Doin, 1923. 306p. il. (Encyclopedie scientifique publiée sous la direction du Dr. Toulouse).

Researches on fungi; an account of the production, liberation, and dispersion of the spores of hymenomycetes treated botanically and physically . . . by A. H. R. Buller. London, Longmans, Green & co. 1909. 287p. il.

A manual of farm grasses, by A. S. Hitchcock. Washington, The author, 1921. 175p. il.

Decorative plants, trees and shrubs, by F. J. Fletcher. London, Benn bros. Ltd. 1922. 68 p. il. (Market nursery work series, Vol. 6).

Feeding, diet and the general care of children; a book for mothers and trained nurses, by A. J. Bell. Philadelphia, F. A. Davis co. 1923. 276p. il.

America's message to the Russian people; addresses by the members of the special diplomatic mission of the United States to Russia in the year 1917. Boston, Marshall Jones co. 1918. 154p.

History of manufactures in the United States, 1607-1860, by V.S. Clark. Washington, Carnegie institution of Washington, 1916. 675p.

Women in chemistry; a study of professional opportunities. New York, The bureau of vocational information, 1922. 272p. (Studies in occupations, No. 4).

History of Oregon, by C. H. Carey. Chicago, The Pioneer historical publishing co. 1922. 1016p. il.

Evolution, racial and habitudinal, by Rev. J. J. Gulick. Washington, Carnegie institution of Washington, 1905. 269p.

The co-operative movement in Yugoslavia, Rumania and North Italy during and after the world war, by Diarmid Coffey. New

York, Oxford university press, 1922. 99p. (Carnegie endowment for international peace. Preliminary economic studies of the war, No. 21).

Some aspects of co-operation in Germany, Italy and Ireland, (a report) by M. L. Darling. Punjab, India, Government printer, 1922. 191p.

Agenda agricole, par G. Wery. Paris, Librairie J. B. Bailliere, 1923. 176p.

The advertiser's handbook; a book of reference dealing with plans, copy, typography, illustrations, mediums, management, etc. of advertising practice, by International Correspondence Schools, Scranton. Scranton, Pa., 1921. 445p. il.

Lessons in cookery; diet for invalids, by F. E. Stewart. New York, Rand McNally & co. 1920. 176p. (Home economic series. Book 4).

The boy with the U.S. weather men, by Francis Rolt-Wheeler. Boston Lothrop, Lee & Shepard co. 1917. 336p. il.

The law of allotments and allotment gardens (England & Wales) by E. L. Mitchell. London, P.S. King, 1922. 147p.

Monetary and banking policy of Chile, by G. Subcraseaux. Oxford, Clarendon press, 1922. 217p. (Carnegie endowment for international peace).

How life came upon the earth, by T. S. Givan. Boston, The Christopher publishing house, 1922. 120p. il.

Handbook and list of members of the National federation of fruit and potato trades' associations (incorporated) Ltd. 1922. London, The association, 1922. 429p.

Hog cholera; its nature and control, by R. R. Birch. New York, Macmillan, 1922. 311p. il.

Fruit et legumes de primeur; culture sous verre et sous abris; tome II: Legumes, par J. Nanot et R. Vuigner. Paris, Librairie agricole de la maison rustique. 305p. il.

Congres de la pomme, Rennes, 4, 5, & 6 Novembre 1921. Rennes, Imprimeries reunies (societe cooperative), 1922. 355 p.

Compte rendu des travaux des centres d'experimentation. Rennes, Imprimeries reunies (societe cooperative), 1921. 263p.

Annual of the rose society of Ontario. Toronto, The Bryant press, ltd. 1918-1919, 1920, 1921, 1922.

The maintenance of the agricultural labour supply in England and Wales during the war, by J. K. Montgomery. Rome, International Institute of Agriculture, 1922. 121p.

THE AGRICULTURAL GAZETTE OF CANADA

New reptiles and stegocephalians from the upper Triassic of Western Texas, by E. C. Case. Washington, Carnegie institution of Washington, 1922. 84p. il.

The broad-sclerophyll vegetation of California; an ecological study of the chaparral and its related communities, by W. S. Cooper. Washington, Carnegie institution of Washington, 1922. 124p. il.

The analytical expression of the results of the theory of space-groups, by R. W. G. Wyckoff. Washington, Carnegie institution of Washington, 1922. 180p.

North American flora, published by the New York botanical garden, Library has: Volumes, 3, 6, 7, 9, 10, 15, 16, 17, 21, 22, 24, 25, 29.

American produce exchange markets. (In *Annals of the American academy of political and social science*, vol. 38, No. 2, Sept. 1911.) 351p.

Pathological herbarium notes, issued by the Office of pathological collections, No. 1, 1920—No. 5, 1922.

The proteins of the wheat kernel, by T. B. Osborne. Washington, Carnegie institution of Washington, 1907. 119p.

The grasses of Hawaii, by A. S. Hitchcock. Honolulu, Bishop museum press, 1922. 230p. il. plates.

Final report from the select committee on the conditions and prospects of the agricultural industry and methods of improving the same. Sydney, Government printer, 1921. 228p. il.

Food and nutrition, including an examination of the climatic factor, prepared at the invitation of the N.S.W. board of trade, by C. E. Corlette. Sydney, Government printer 1921. 71p.

The cactaceae; descriptions and illustrations of plants of the cactus family, by N. L. Britton and J. N. Rose. Washington, Carnegie institution of Washington, 1922. 255p. il. colored plates.

Index of economic material in documents of the States of the United States; Pennsylvania, 1790-1904. Part III: rainfall to Z by A. R. Hasse. Washington, Carnegie institution of Washington, 1922.

Effects of winds and of barometric pressures on the Great Lakes, by J. F. Hayford. Washington, Carnegie institution of Washington, 1922. 133p.

Le sauvetage national par le retour a la terre. Port-au-prince, Haiti, Imprimerie Aug. A. Heraux, n.d. 10p.

Law and regulations concerning plant quarantine service in Japan. Published by Imperial plant quarantine station, dept. of agriculture and commerce, Japan, 1919. 24p.

Les landschaften et leurs operations de credit hypothecaire en Allemagne (1770-1920) par M. Techerkinsky. Rome, Imprimerie de la chambre des deputes, 1922. 94p.

Native plants of Wisconsin suitable for cultivation, by William Toole, Sr. Madison, Wisconsin State horticultural society, 1922. 54p.

Regulations of the international congress on cattle-breeding to be held under the august patronage of H. M. the Queen of the Netherlands, at The Hague, from August 29 till September 4, 1923. 5p.

The Canadian banking system; a simple explanation of the banking and currency systems of Canada, by J. W. Ward. Winnipeg, Canadian council of agriculture, 1922. 15p.

Live-stock industry of the United States. Washington, Government printing office, 1922. 7p.

Teff grass; a valuable hay and pasture grass for arid and semi-arid tropical and warm-temperate regions, by Joseph Burtt-Davy. Johannesburg, The author, 1916. 36p.

Fur farming in the province of Quebec describing the most approved methods of propagating foxes and other fur-bearing animals in captivity, by E. T. D. Chambers. Quebec, 1920. 52 p. il.

Frame construction details. Chicago, National Lumber manufacturers association, 1920. 28 plates.

Papers from the Department of Marine biology of the Carnegie institution of Washington. Washington, Carnegie institution, 1922. 181p. il.

NEW PUBLICATIONS

DOMINION DEPARTMENT OF
AGRICULTURE

Division of Chemistry, 1921.—Interim Report of the Dominion Chemist, Frank T. Shutt, M.A., D.Sc., F.I.C. Dominion Experimental Farms.

Experimental Station, Kentville, N.S., 1921.—Interim Report of the Superintendent, W. Saxby Blair. Dominion Experimental Farms.

Steer Feeding Experiments in Prince Edward Island, 1912-1922.—By J. Clark, B.S.A., Superintendent, Experimental Station, Charlottetown, P.E.I., and B. Frank Tinney, B.S.A., Assistant. Pamphlet No. 23—New Series. Dominion Experimental Farms.

Is Cow Testing Worth While?—By A. H. White, B.S.A., Senior Dairy Promoter, Dairy and Cold Storage Branch. Pamphlet No. 24—New Series.

Fruit and Fruit Packages.—Sections of the Inspection and Sale Act, Part IX, and notes of special interest to fruit growers, shippers and dealers. Administered by the Fruit Branch, Acts, Orders and Regulations No. 4.

ONTARIO

Statistics Branch.—Annual Report, 1921. Part I.—Agricultural Statistics; Part II.—Chattel Mortgages.

The Production and Marketing of Ontario Cheese.—By R. D. Colquette, B.S.A., Professor of Marketing Economics, and B. G. Jenvey, Assistant Director of Farm Surveys, Department of Farm Economics. Ontario Agricultural College. Bulletin 291.

Farm Poultry.—Bulletin 292 (Revised edition of No. 247) Poultry Department, Ontario Agricultural College.

QUEBEC

The Farm Gas Engine.—Its Operation and Adjustment. By L. G. Heimpel, Depart-

ment of Agricultural Engineering, Macdonald College. Bulletin No. 78.

Fourteenth Annual Report of the Dairy-men's Association and of the Dairy School of the Province of Quebec, 1921.—Supplement to the Report of the Honorable the Minister of Agriculture.

SASKATCHEWAN

Oat Production in Saskatchewan.—Contributed by the Department of Field Husbandry. Agricultural Extension Bulletin No. 14. College of Agriculture.

ALBERTA

Growing Sweet Clover.—By G. H. Cutler and G. F. H. Buckley; College of Agriculture, University of Alberta, Edmonton. Bulletin No. 2.

BRITISH COLUMBIA

Native Flowers for Bees.—By J. Davidson, F.L.S., F.B.S.E., Botanist in Charge of the Herbarium and Botanical Gardens, University of B.C.

MISCELLANEOUS

Canadian Highways and Roads.—Department of Railways and Canals, Highways Branch. Bulletin No. 1.

Progress of Canadian Highway Construction.—Report of Chief Commissioner of Highways, 1921. Bulletin No. 2. Department of Railways and Canals, Highways Branch.

Dominion Shorthorn Herd Book, 1922.—Volume 39 of the Dominion Shorthorn Herd Book contains the pedigrees of Shorthorn Cattle imported and Canadian bred. Edited in the Office of the Canadian National Live Stock Records, Ottawa, and published by the Dominion Shorthorn Breeders' Association.

PART V

The International Institute of Agriculture

FOREIGN AGRICULTURAL INTELLIGENCE

All communications in regard to this section should be addressed to T. K. Doherty,
International Institute Commissioner, Department of Agriculture,
West Block, Ottawa.

THE INSTITUTE'S PUBLICATIONS

In accordance with the recommendations made by the General Assembly of May 1922, the Institute has brought about the following changes in the publication of its three regular bulletins.

The International Crop Report and Agricultural Statistics for 1923 is to be enlarged considerably. The three parts: *Production*, *Trade*, and *Prices* will be united so as to form a single volume of 50 pages, which will be published monthly on the Thursday nearest to the 20th of the month.

The part devoted to *Production* gives, as it were, a picture of the world-situation as to the areas and the production of the most important agricultural products (cereals, potatoes, vines, sugar, cotton, etc.). The Institute, which receives its information to a large extent telegraphically, furnishes the most recent data compared with the data corresponding for the previous year and with those for the preceding quinquennial period; besides news concerning weather, crop conditions, sowings, harvest prospects, etc. Each number of the said publication will contain detailed statistics on the number of *live stock* existing in the different countries.

The part devoted to *Trade* will comprise a series of tables containing data relative to the imports and exports of the different countries, by seasons and by months for the following products: wheat, wheat flour, rye, barley, oats, maize, rice, linseed, cotton and tea.

By consulting the tables of *Prices* the reader will be able to compare the recent prices of cereals and of cotton on the various markets of the world, with an extensive list of previous prices, thus obtaining a true knowledge of the tendencies of these markets; this comparison will be facilitated also by the index numbers of the various prices which are inserted.

The area and production of crops are now given in the crop report in acres and centals, and a separate sheet is issued with each number giving the production of wheat in bushels.

Subscribers to the *International Crop Report and Agricultural Statistics* will receive

free during the year two summarized statements of the world's cereal requirements and supplies.

The annual subscription price is \$3.00.

The *International Review of the Science and Practice of Agriculture* hitherto published monthly, will, from now on be published quarterly. Each issue will contain about 250 pages. The first number will be issued at the end of February.

Part I of the Review will include original articles by recognized authorities dealing with important agricultural problems of world-wide interest. Part II will include technical information obtained from all parts of the world. Part III will consist of notices concerning the outstanding events from the agricultural standpoint such as conferences, exhibitions, shows, etc.

The annual subscription is \$3.00.

The *International Review of Agricultural Economics*, beginning with this year will be transformed from a monthly into a quarterly review. It will continue to deal with agricultural co-operation, agricultural insurance, credit, the economic and social conditions of the agricultural classes, land systems, etc.,. An attempt will be made to give greater variety and greater general interest to the articles by having recourse to outside contributors.

Attention might be drawn to the fact that two very valuable articles on Canadian subjects were published in recent numbers of the Review: "Rural Credits in Canada" by Professor W. T. Jackman of Toronto University, and "Co-operation for the Marketing of Agricultural Produce and the Supply of Farm Requisites in Canada," by W. E. H. Lang, of the staff of the Institute Bureau of Economic and Social Intelligence. These two articles have lately been republished as separate pamphlets.

The annual subscription for the Review is \$2.00.

The subscription price for all three of the above mentioned publications taken together is \$6.00.

THE AGRICULTURAL GAZETTE OF CANADA

The eleventh volume of the *International Year Book of Agricultural Legislation* has just been issued. It contains the more important legislation on agriculture enacted in the different countries in 1921. Although published in the French language only there is a lengthy analytical introduction in English which gives synopses of many of the laws given in detail in the text. The price of the volume is 30 francs.

The *International Year Book of Agricultural Statistics*, 1909 to 1921. The most complete work of its kind published; it is arranged for the use of both English and French readers. Price \$2.00.

OTHER PUBLICATIONS

Commerce International du Bétail et des Dérivés (Statistical Tables) 136 pages, 8 francs.

Produits Oléagineux et Huiles Végétales (a statistical study of their production and trade) 443 pages, 20 francs.

The Landschaften and Their Mortgage Credit Operations in Germany, 90 pages, 3 francs.

Profit Sharing in Agriculture in Great Britain and Ireland, 24 pages, 1 franc.

SCIENCE AND PRACTICE OF AGRICULTURE

136.—The Part Played by the Rabbit and Other Domestic Animals in Protecting Man From Mosquitoes.—LEGENDRE, J., in *La Nature*, No. 2487. Paris, December 3, 1921.

There has been previous references to the role of animals in protecting man against the bites of the mosquitoes that convey malaria. Domestic animals living in the neighbourhood of human beings are attacked by *Anopheles maculipennis* in preference to the latter. The author, basing his opinion upon the observations made in collaboration with Oliveau, states that the rabbit is very useful in this connection. In many districts of France, the rabbit enclosures have been found to be infested with *Anopheles* when the stables and houses were completely free even in summer. The young rabbits are bitten in the hairless parts of their bodies, viz., the ears and muzzle.

CROPS AND CULTIVATION

147.—United States Production of Fish Scrap and Meal.—*The American Fertilizer*, Vol. LV, No. 10, p. 92. Philadelphia, Nov. 5, 1921.

According to the *Report of the Bureau of Fisheries, Department of Commerce*, the estimated production of fish and whale scrap and meal in 1920 was 130,000 tons, a material increase over previous years. Of this amount 16,898 tons are credited to the Pacific Coast States and Alaska. On the West Coast, as a result of the heavy demand for fertilizer material, more than the usual amount of scrap was used for this purpose. In the "menhaden" industry of the Atlantic Coast, the value of the Bureau's assistance in encouraging the production of fish meal has been greatly appreciated. At least 5,000 tons of meal were turned out by the producers in 1920 and considerable quantities of unground scrap are stated to have been sold to manufacturers interested in supplying stock feeds. The Bureau of Animal Industry

of the Department of Agriculture has continued its hog-feeding tests, using various fish meals, and samples have been supplied to some fifteen State Experiment stations with satisfactory results. The experiments in progress include the feeding of meal with high oil content, samples without removal of natural oil with additional oil added and meal made from decomposed fish. If these tests yield satisfactory results, the producers of fish meal should be reasonably assured of markets for their product as the farmers have become acquainted with their merits. The whaling companies have recently expressed an interest in the manufacture of whale meal and have provided material for a feeding test.

Considerable quantities of fish offal and waste fish incident to the New England fisheries remain unutilized, and in some cases its disposal is an item of no little expense to the producer. Lack of a regular supply makes the operation of the larger reduction plants impracticable, and the smaller plants do not appear to be wholly satisfactory for the proper reduction of some of the raw materials in greatest abundance. The Bureau appreciates the need of solving the problems in this field and hopes to be in position to take them up in the near future.

149.—Distribution of Manganese in the Organism of Higher Plants.—BERTRAND, G., and ROSENBLATT, M., in *Comptes rendus de l'Académie des Sciences*, No. 22, pp. 1118-1120. Paris, November 29, 1921.

After having proved that manganese is of general occurrence in plants the authors endeavoured to ascertain the manner in which this metal is distributed, both in the different organs of plants, especially of the higher plants, and also in the various parts of any specimen gathered at a given growth period.

The results obtained show that a large amount of manganese is present in the organs

THE AGRICULTURAL GAZETTE OF CANADA

that are the seat of active metabolism in the reproductive organs, leaves, young shoots and in all the organs containing chlorophyll as well as in seeds.

237.—Supplies of Organic Matter in the Soil; Research Carried Out at the Rothamsted Experimental Station (England).—RUSSELL, E. J. (Director, Rothamsted Experimental Station), in *The Journal of the Ministry of Agriculture*, Vol. XXVIII, No. 9, pp. 779-782. London, December, 1921.

Recent experiments emphasize the importance of having ample supplies of organic matter in the soil, although some of the older

agricultural chemists were inclined to the view that artificial fertilizers were the chief source of soil fertility and all that need be done was to apply them in the required amounts. Organic matter however as supplied by farmyard manure improves the conditions for the root-crops, facilitating the production of tilth and increasing the water-holding capacity of the soil. It also improves the growth of clover, and causes less variations in yield from year to year than artificial manure; further, its use involves less risk of deterioration of soil when the course of cropping is abnormal, as in the case where the field receives an insufficient amount of fertilizer, or a manurial treatment deficient in one or more essential constituents.

Comparison of Farmyard with Artificial Manures

Continuous wheat

Plot No.	Treatment	Average yield bush. per acre	Mean annual diminution bush. per acre	Percentage of relative variance ascribable to weather
3 and 4	2 b Farmyard manure, 14 tons annually.....	34.549	0.031	2.78
	No manure.....	12.629	0.097	6.20
	5 Complete mineral manure.....	14.180	0.090	5.84
	6 As 5 + single ammoniacal salts.....	22.581	0.141	6.01
	7 As 5 + double ammoniacal salts.....	31.367	0.144	5.11
	8 As 5 + treble ammoniacal salts.....	35.694	0.092	4.18
	10 Double ammoniacal salts alone.....	19.504	0.157	11.10
	11 As 10 + Superphosphate.....	22.046	0.219	10.32
	12 As 10 + Super + Sulph Soda.....	28.319	0.181	7.28
	13 As 10 + Super + Sulph Potash.....	30.209	0.123	5.55
	14 As 10 + Super + Sulph Magnesia.....	27.765	0.231	6.38
	17 Mineral alone, or double ammoniacal.....	14.510	0.092	10.16
	18 Salts alone, in alternate years.....	29.006	0.114	4.55
Alternate				

The following data, which represent the result of a series of experiments lasting 68 years, prove without doubt that farmyard manure is more dependable than other fertilizers, although it is not capable of giving as good yields in favourable seasons as a properly balanced mixture of artificials.

The superiority of farmyard manure to artificials is shown by two diagrams. One proves the steadiness of its effects as compared with the effects of a complete manure, phosphatic manure, and a nitrogen-potassic and phosphato-potassic manure respectively, in increasing the yields of continuous crops of barley grown from 1852-1919. The other shows the effect of farmyard manure and of artificials on clover and wheat (grain and straw) succeeding a corn crop.

A good deal of work is being done at Rothamsted and elsewhere to discover the scientific reasons for these various effects and the best way of using farmyard manure, but in the meantime there is another and far more urgent problem: how can the supply of farmyard manure or similar materials be increased?

Two general methods are being studied at Rothamsted. The first consists in reducing the wastage in making and storing farmyard

manure, which is very considerable. The second consists in actually increasing the supply of farmyard manure or like substances on the farm, either by keeping more live stock, or by adopting substitutes for farmyard manure. The success attained in the experiments in progress at Rothamsted on the decomposition of straw by artificial means makes it most probable that given a proper air and moisture supply, suitable temperature, freedom from acidity and the addition of the right proportions of soluble nitrogen compounds, a substance resembling farmyard manure can be produced.

Another method of attaining the same object is by the use of green manuring, but for this to be an economic possibility it is necessary to sow a catchcrop after the harvest. Sewage can also be used and an extensive experiment, which was carried out at Rothamsted from 1918-1920, has proved that "activated sludge" gives a fertilizer of high value, very considerably better than anything yet obtained.

The Influence of Common Salt on Sugar-beets.—HOFFMANN, M., in *Blatter für Zuckerrubensbau*, Vol. 28, No. 15-16, pp. 157-162. Berlin, 1921.

Several sets of laboratory and field studies on the influence of common salt on the growth, quality, and water utilization of sugar beets as compared with results from pure sodium chloride, Glauber salt, sodium nitrate, and calcium chloride are reported.

Common salt and generally most sodium salts increased the quantity and quality of the sugar beet crop on both light and heavy soils where only light potash applications had been made and heavy sodium fertilization was practised. Glauber salt and sodium nitrate gave better results than calcium chloride. This is taken to indicate that it is the sodium of the common salt and not the chlorine which favourably influences the growth of crops.

It was found that the use of sodium reduced evaporation and increased the water-holding power of the soil. It is also thought that through an exchange of bases it is capable of rendering certain relatively insoluble nutritive salts more available to plants. When sodium salts were used, the sodium was found almost exclusively in the leaves of the plants, where it apparently displaced a certain amount of potash. An increase in the sugar content of beets also accompanied fertilization with sodium salts.

248.—On the Fixity of Characters in New Hybrid Potatoes.—SCHRIEBAUX, in *Comptes Rendus des Seances de l'Academie d'Agriculture de France*, Vol. VIII, No. 4, pp. 81-82. Paris, January 1922.

Aumot, who is continuing his researches on new potato hybrids obtained from seed has found that in certain cases the qualities (characters) of the parents are intensified in the hybrids.

Many of the latter when propagated from naturally fertilized seed have proved very stable.

A hundred individuals belonging to line No. 120 (Beurre x Bolivienne 10 bis 1919) possess all the characters of their parents, luxuriant, strong-growing foliage, the shape and pink skin of Bolivienne 10 bis and the yellow pulp of Beurre.

In 1921, when the ordinary varieties produced tubers for the most part unfit for "seed," the hybrid potatoes were entirely satisfactory in this respect.

Some types were wonderfully resistant to the drought and at the same time very productive. The yield of some of the hybrids raised from seed often exceeded 1 kg. per clump; No. 90, the most prolific, produced 1.3 kg. per clump; some of the tubers weighed as much as 340 gm. each.

These results are really remarkable; they are specially striking, because in 1920, some of the hybrids proved to be immune to *Phytophthora infestans*, which shows that it is possible to obtain types uniting superior qualities with resistance to this destructive parasite.

163.—Development of Potato Tubers, Experiments Made in Colorado, U.S.A.—CLARK, C. F., in *Bulletin No. 958, United States Department of Agriculture*, pp. 1-27. Bibliography of 12 works. Washington, D.C., Aug. 22, 1921.

The experiments here described were carried out at the Colorado Potato Experiment Station, Greeley, during the seasons 1916-18. A few minor observations were also made in Maine in 1919 for the purpose of verifying previous conclusions as to the time of the beginning of tuber formation. While these studies could profitably be extended to cover a longer period and include a greater number of varieties and a wider range of environmental conditions, the author considers it advisable to place on record the results obtained up to the present time.

The material used for the experimental work was grown under field conditions, the cultural operations following those in general use in the locality. The minimum size of tubers saved was $\frac{1}{2}$ inch. When a separation was made into marketable potatoes and culls, the division was by weight, the former including those equal to or exceeding 3 ounces and the culls those below that limit.

The statistical studies of tubers at one-week intervals showed that the greater part of those which grew to exceed $\frac{1}{2}$ inch in diameter were formed at the start of tuber development. The maximum rate of growth of tubers was found to occur at the end of August or beginning of September, approximately 80 days after planting. At this time nearly $\frac{1}{3}$ of the total period of tuber development had been completed. The differences in the sizes of the tubers in the individual hills may be attributed largely to the unequal rate of growth rather than to the difference in the age of the tubers. A small increase in the weight of tubers was found to occur after the vines had been killed by frost.

The weight of the tuber did not appear to be correlated with the length of the stolon upon which it is produced. The average data show a tendency towards a decrease in the size of the tuber on the upper stolons, though the individual plants showed considerable diversity in this respect. The greatest average weight was produced by the lower stolons in the 2-stolon and 3-stolon groups; while in the 4-stolon group the maximum production was in the second position, with a gradual decrease in the weight in the upper stolons. Larger numbers of observations are however needed to establish the laws governing these relationships.

The number and weights of tubers per hill were found to be influenced by the size and kind of sett planted. The relative influence of whole and cut setts on tuber production using the Rural New Yorker variety of potatoes has been determined and it appears

according to the data given that a slightly larger number and with one exception a larger weight of tubers per stem was obtained when whole setts were used.

The fact that the tuber producing ability of different varieties varies considerably with respect to the number and weight of tubers per hill is brought out very clearly in the diagrams showing the number and weight of tubers per hill produced in 500 hills of Rural New Yorker (average 4.5 and 860.7 gm. respectively) and 500 hills of Pearl (average 6.9 and 944 gm. respectively). A further comparison of the behaviour of different varieties under varying treatment with respect to irrigation was made. The varieties tested were Triumph, Early Ohio, Charles Downing, Russet, Burbank, Peach-blow, Late Ohio, in addition to the two varieties above mentioned. The number of tubers per hill ranges from 3.8 in Rural New Yorker to 7.1 in Charles Downing. The lowest average weights per hill were produced by the two early varieties, Triumph and Early Ohio, the highest by the late variety Pearl. Apparently the application of water before tuber formation had begun, increased the number of tubers. Increasing the number of irrigations appears to have had little effect on the number of tubers; the weight per hill was however increased by each additional irrigation except where the applications were too frequent.

The experiments on different types of soil revealed the existence of a close relationship between the character of the soil and the number and weight of tubers. Fine sandy loam invariably gave the best results, the number of tubers per hill (Rural New Yorker var.) being 6.3 and weight of tubers per hill 1033.5 gm. (average 162.8) compared with clay loam, 4.9, 663.7 gm. (average 136.5) and heavy clay 3.0, 376.7 gm. (average 125.3) respectively.

253.—The Possibility of Determining Value of Seed by Biochemical Means.—NEMEC, A., and DUCHON, F., in *Comptes Rendus de l'Académie des Sciences*, Vol. 173, No. 20, pp. 933-935. Paris, November 14, 1921.

The authors have studied the relations between the vitality of seeds and their diastatic activity with a view to ascertaining the possibility of determining the agricultural value of seeds (especially their germinating capacity and energy), by a rapid and at the same time easy biochemical method offering greater advantages than the germination test which is sometimes a lengthy process, lasting 5 to 30 days (seeds of forest trees), according to the species.

They have investigated the relations of the various diastases (amylase, invertase, glycerophosphatase, lipodiastase, urease, uricase, phytotryptase and catalase of seeds), to the vitality of seeds of different species

(maize, white mustard, soy-bean) varieties, and origin.

The results have shown that the action of hydrolysing diastases can survive the germinative capacity of the seed. The catalase behaves in a totally different manner; it would seem that the lost vitality of the organism is intimately connected with the impaired activity of the catalase. It is well known that this enzyme is extremely sensitive to the hydrogen ion; possibly the chemical changes taking place in the seed, which are characterized by the progressive acidification of the organism, bring about the gradual cessation of the activity of the catalase; in dead seeds this activity seems almost completely at an end. The small amount of oxygen released in this case may be attributed to the action of mineral catalysts or to the colloidal substances present in the seed.

It is evident that the activity of the catalase, as measured by the cubic centimetres of oxygen liberated, affords an excellent means of quickly and easily determining the agricultural value of seeds. The estimate can be made in a few minutes. It only remains now to fix the limits for the practical application of this vital test.

256.—Mansholt III, a Variety of Oats Resistant to Lodging.—DESPREZ, F., (Directeur de la Station expérimentale agricole de Cappelle, Nord), in *Journal d'Agriculture pratique*, Year I, No. 5, p. 101. Paris, February, 1922.

The author reports the very satisfactory results he has obtained with Mansholt III. This variety of oats was obtained by selection from Victoire de Svalof by Prof. Mansholt of the Royal Netherland College of Wageningen (Holland).

Its chief characteristics are: fairly short, very thick, stiff straw; with panicle; white, plump grain like that of the Victoire variety; but distinctly larger; matures early, ripens well in good seasons, the weight per bushel is $41\frac{1}{2}$ to $42\frac{1}{2}$. As Mansholt III does not tiller it must be sown closer.

It is an excellent oat, very resistant to lodging; it should not be grown on poor, light soils, but it is very suited to rich, liberally manured land.

Grassland.—R. G. STAPLEDON, in a pamphlet of 19 pages, published by the University Press, Oxford, 1921.

In this paper the author compares permanent with temporary grass and mixtures with single species, and discusses improved herbage plants, rotations with grass as a pivotal crop, and the management of temporary grass.

Work with herbage plants at Aberystwyth, Wales, has shown the incompatibility of certain species for growth together—rye

grass and cocksfoot (orchard grass), tall oat grass and cocksfoot, and late-flowering red clover and alsike clover being examples of this tendency. Different species compared in pure plats exhibited different growing periods, and it was noted that stock chose one species at one date and another at some other time. In March and April sheep grazed tall oat grass in preference to nearly all other grasses, while Italian rye grass and cocksfoot were preferred to perennial rye grass in April. The influence of a previous year's management on early spring productivity was demonstrated where beds of cocksfoot cut once during 1920 returned over twice as much green material during February and April, 1921, as beds cut once in 1920 for hay (June) and 7 times afterwards, and four times as much as beds cut once for hay (May) and cut 10 times afterwards.

Indigenous forage plants proved far more leafy and produced more tillers than plants from imported seed. The average number of tillers produced by plants more than one year old was as follows: Red clover, Montgomery 150, Cornish Marl 125, Canadian 68, English late-flowering 50, Chilean 30, and Italian 27; timothy, native 160, commercial 70; tall oat grass native 130, commercial 80; and cocksfoot, native 95, commercial 60. Hay from native, American, Danish, and French cocksfoot contained 38, 24, 25, and 23 per cent of leaves, respectively. The indigenous forms of all the species, except red clover, have a general tendency to flower later than the imported, some of the wild cocksfoot flowering from 10 to 20 days later.

257.—The World Production of Soya.—*Olien-Veiten en Oliezaden*, Year VI, No. 22, p. 254. Amsterdam, November, 22, 1921.

The most recent returns for the world's production of soya are as follows (in tons): China 3,352,400; Japan, 430,933; Corea, 348,000; United States, 58,000; total, 4,189,333 tons.

In 1918, Japan absorbed 77 per cent of the Chinese production, America and Europe, 7 per cent, China, 16 per cent.

In 10 years the soya oil exported from China has risen from 25,000 tons to about 400,000 tons. Before the war, this oil was sent to England, the United States, Belgium, Japan and Russia. During the decade, the exports of soya-cake has increased from 400-500 tons to over 1 million tons.

261.—Alfalfa Production Under Irrigation, Experiments in the United States and in New South Wales.—I. STEWART, G., Alfalfa production under irrigation in *Utah Agricultural College Experiment Station, Circular No. 45*, pp. 3-48, tables VII, figs. 13. Logan, Utah, May 1921.—

II. HARRIS, F. S., and PITTMAN, D. W., The Irrigation of Alfalfa, in *Ibid Bulletin* 80, pp. 3-30, Figs. 8. Logan, 1921.

III. CHOMLEY, F. G. and CHAFFEY, F.A., Producing Lucerne Hay Under Irrigation, in *Dept. of Agriculture New South Wales, Farmer's Bulletin No. 143*, pp. 3-22, figs. 19. Sydney, Oct. 1921.

I-II.—Field and tank experiments on the irrigation of alfalfa were conducted at the Utah Experiment Station, U.S. and apart from the general methods of cultivation employed which are described in detail the following results are worthy of special note.

The best results were obtained when irrigation water was applied in 3 to 5 heavy applications on loams or clay loams, but in 4 to 10 frequent light applications on porous soils. In these experiments the yield generally increased as the total amount of water applied increased up to 90 acre-inches (the highest amount applied), but the gain in yield from the application of more than 30 acre-inches was too small to pay for the extra labour; 25 in. applied in weekly quantities of 2.5 in. gave better results than 30 in. where 5 in. was applied each alternate week. With an equal amount of water, frequent moderate applications gave better yields than fewer heavy ones.

Where irrigation was not practised, 55 per cent of the entire yield came from the first cutting and 14 per cent from the third. Where regular quantities were applied each week, from 33 per cent to 37 per cent of the crop came from cutting I, from 37 to 39 per cent from cutting II and from 25 to 30 per cent from cutting III.

The relative yields of the different cuttings were to a certain extent changed when the water was applied at various times; but this did not affect the total annual yield consistently.

Apparently the yield was highest when the soil moisture content was kept constantly at 25 per cent.

III.—Alfalfa growing for hay has for some years become a feature of some importance on the Yanco Experiment Farm in New South Wales, and so profitable that the area has been considerably extended; there are now 120 acres under crop with an average of 6 or 7 cuts per season. Speaking generally, one irrigation for each cut has been found sufficient for the early part of the season, but later an average of two per cutting. Irrigation takes place a week before cutting; a second watering is given as soon as the hay is taken off. A big body of water is never turned on the alfalfa at one time. The head ditch is filled and then a gap is opened in the bank about half way between the check banks, allowing enough water to escape to spread from bank to bank, just covering the surface and moving forward very slowly. It should take from

6-8 hours for the water to reach the lower end of the block 6 chains away, by which time the water can be shut off at the upper end. This method is adaptable to heavy soil but on lighter soil, the flow can be somewhat faster. It is considered imperative that facilities be provided for thorough surface drainage, as water lying on alfalfa for 3 hours on a hot day will do irreparable damage to the stand.

Apart from the details with regard to irrigation methods employed in New South Wales, the author gives an interesting description of the hay machines, etc. used, and certain cultural details.

170.—The Oil-Bearing Sunflower on the "Riviera Di Ponente," Italy.—PERSICO, W. in *Costa azzurra Floreale-Agricola*; reprinted in *Bolletino dell' Associazione italiana pro Fiante medicinali, aromatiche ed altre utili*, Year IV, No. 10, pp. 155-156. Milan, October, 1921.

The author recommends that the large, one-flowered, so-called Russian variety of *Helianthus annuus* should be grown as oleiferous plant in the Riviera di Ponente, as its product is quite equal to olive-oil. Very satisfactory trials have been made in the experiment vineyards and rosegardens of Pietralunga, where it has been found that about 20 quintals of seed per hectare may be expected. The seeds give 15 per cent of oil and 80 per cent of sunflower-seed cake, or 3 quintals of oil and 16 quintals of cake per hectare. Without irrigation, some plants, 46 cm. in height and with heads 46 cm. in diameter, were obtained.

The seeds of the sunflower are not only used for cakes, and in a variety of other well known ways, but also supply an excellent flour for cake-making, while the stalks furnish a silk-like fibre and an ash with a high potash content. A brilliant yellow dye is obtained from the petals, and the leaves are used instead of those of *Datura Stramonium* as a remedy for asthma.

LIVE STOCK AND BREEDING

273.—Use of Stomosines in the Treatment of Infectious Diseases of Live Stock.—CENTANNI, E., in *l'Italia agricola*, Year 58, No. 12, pp. 366-368. Plaisance, December 15, 1921.

Stomosines are immunising substances discovered by the author which differ from those hitherto known (serums and vaccines). The latter have a preventive and the former a curative effect; they contain in an innocuous form the principle that destroys the micro-organisms and their poisons.

When the preparation of serums was extended to all infectious diseases, insurmountable difficulties were experienced owing to the different kinds of poisons produced by

bacteria and the various ways of neutralizing them.

Bacteria are the cause of two distinct sorts of poisons, true specific toxins and aspecific endotoxins. The first are the product of the very small number of the least common bacteria consisting almost exclusively of the pathogenic agents of tetanus and diphtheria; in the case of all the others, the fundamental poison causing the complex of the symptoms is an endotoxin. Since it is impossible to make immunising serums against endotoxins, it may fairly be said that a serotherapeutic has found itself disarmed in the face of most infectious diseases and is unable to intervene with any prospect of success when once the syndrome has declared itself.

In trying to discover what defensive means the organism adopts during the course of the disease, in order to free itself from these poisons and regain health, the author found that the active agent is a ferment or rather a kinase, increasing the activity of the ferments and so constituted that the endotoxins are attacked and burnt, being thus quickly reduced to inoffensive substances.

The author has given the name of "stomosine" to this kinase which he prepared and isolated by means of chemical processes, taking as his point of departure the protein-bacterial principles arising from the micro-organisms inducing the disease.

The poisons disseminated by the bacteria installed in the organism have two ways of manifesting themselves. Those carried by the blood produce the syndrome of fever and all the local troubles accompanying it (abscesses, sores, ulcers, etc.), while the others cause the complex of symptoms resulting in the irritation and inflammation of the tissues surrounding the centre of infection. As is required by this double symptomatology the action of the stomosines is also twofold, being both general and local.

Shortly after infection, which is followed by violent shivering, a rise of temperature takes place (average 1° to 1.5°C) showing that the combustion of the infected matters has begun. The temperature remains at this level for 8-10 hours and then suddenly falls (the change being accompanied by profuse sweating) to normal or nearly normal. If the effect is complete, a single injection is enough to produce a cure. Sometimes, however, it is necessary to repeat the operation two or three times to obtain the definitive results. In some of the most resistant cases, the disease becomes of a benign character.

The effect upon the local centre is similarly explained: the irritant poisons are destroyed and therefore all the symptoms of inflammation (congestion, exudations, pain) are removed, the surface becomes healthy and cicatrisation rapidly takes place.

So far stomosines have been prepared for the chief infectious diseases of cattle (epi-

zootic foot-and-mouth disease, diarrhoea in calves, polyarthritis and septic pneumonia); of pigs (swine fever, septicaemia, paratyphus and measles); of horses (equine adenitis, colt polyarthritis) and of poultry (fowl cholera and avian pest.)

Even where the pathogenic agent is an invisible virus that cannot be cultivated, the effect of the stomosines is satisfactory, probably because also under such a form the actual toxic factor is an intermediate poison of the nature of an endotoxin. This is the case with the virus of epizootic foot-and-mouth disease, swine fever and avian pest; all these diseases and especially swine fever have proved amenable to stomosine treatment.

Stomosines are agents of an essentially curative character; as soon as they are introduced into the organism, they find themselves in the presence of poisons and bacteria which they attack and render powerless as described above. If, as in the case of preventive infection in a healthy organism, they encounter no pathological element, they remain in the circulatory system, but their power decreases somewhat rapidly in the course of a few days.

Their true use is to effect a cure, and they act even if introduced when the disease is in full development, or actually far advanced, but to obtain a more certain result, they should be employed as soon as the malady first declares itself. If an outbreak of epizootic disease occurs in a stable not only the first animal attacked should be treated but also all the animals that have been in contact with it, in order to interrupt the incubation of the disease or prevent its occurrence.

Should the disease have made its appearance in the neighbouring stables, a general preventive treatment must at once be begun in all the threatened stables without waiting for it to assume an epidemic form. In order to prolong the protection, seeing that the immunisation is not of very long duration, the injection ought to be repeated on an average every fortnight, as long as any danger threatens; in this way the owner may be sure that his stock will entirely escape infection or that the disease will assume a benign form in any of the animals attacked.

Stomosine is supplied in two forms, (a) liquid for immediate use, (b) as a soluble sterilized powder for keeping a long time. The average dose is 5 to 10 cc. per quintal of weight. The most effective way of using it is in the form of an intravenous injection; this induces the largest number of instantaneous crises and should be adopted for very urgent cases. In ordinary cases, since the liquid diffuses very readily, a subcutaneous injection is all that is required. The injection has never produced bad effects, for the substance of which it is composed is an

elective kinase without any toxic or anaphylactic action.

178.—**The Effect of Chloropicrin Fumes on Argas Reflexus.**—REMY, M. P., in *Comptes Rendus de l'Académie des Sciences*, Vol. 172, No. 25, pp. 1619-1624. Paris, June 1921.

Argas reflexus is a parasite causing great mortality in pigeon lofts, and sometimes producing serious affections in man. The destruction of this pest is a very difficult matter, for it can remain without food for several years and none of the insecticides hitherto used are absolutely certain in their effects. This does not apply however to the fumes of chloropicrin which have proved to be highly toxic in the case of other insects also. The author has found that if *A. reflexus* is exposed to these fumes paralysis ensues which always ends in death. No experiments on a large scale have been made but doses of 20 to 30 gm. per cubic metre seem the most effective. The fumes should be allowed to act all day and if masks are worn there is no danger in the operation. As the hatching period lasts from 8 to 15 days, a second treatment one month after the first will be necessary, in order to destroy the mites that have hatched out last.

179.—**The Autopytherapeutic Treatment of Strangles.**—MONBET, M., in *Revue Vétérinaire*, Vol. LXXIII, Third Series, Vol. II, pp. 338-344. Toulouse, June, 1921.

The excellent results obtained by the pyotherapeutic treatment of contagious lymphangitis in the horse suggested to the author that the same methods might be applicable to strangles which is the chief pyogenic equine disease.

The technique used was a series of autopytherapeutic injections. The pyovaccine was prepared according to the method described by BELIN, in the *Bulletin de la Société Centrale de Médecine Vétérinaire*, of Feb. 28, 1919, p. 73.

Injections were made into the muscles of the central region of the collar at equal distance from the mastoid-humeral, the upper edge of the collar, and the front edge of the shoulder.

The region is first shaven and then disinfected by painting with tincture of iodine.

The injection is made by means of the short needle used for intradermo-palpebral maleinage attached to a 5 or 10 cc. Pravaz syringe. The amounts used are as follows: (1) four first doses increasing from 1 cc.—1.5 cc.—2 cc.—2.5 cc. on the first four days—(2) Two doses of 2.5 cc. on the fifth and sixth days.

The experiments made on four mares showed that strangles can be cured by autopytherapeutics; this treatment, at all events if the technique described in this

THE AGRICULTURAL GAZETTE OF CANADA

work is adopted, is perfectly safe; it seems to check the development of specific inflamed adenoids, but has little perceptible effect upon the course of catarrhal local affections.

191.—Effect of Shelter and Temperature of the Drinking Water on the Increase in Weight of Fattening Cattle, Experiments in the United States.—POTTER, E. L. and WITCOMBE, R., in *Oregon Agricultural College Experiment Station, Eastern Oregon Branch Station, Bulletin No. 183*, pp. 5-11. Corvallis, Oregon, Sept., 1921.

Experiments conducted over a period of several years at the Eastern Oregon Branch Station with cattle and dairy cows have shown that fattening cattle, fed under shelter and having access to a paddock, consume a quantity of feed equal to that consumed by animals reared in the field, and the actual gain established is comparatively negligible. The results obtained with fatten-

ing dairy cows indicated no noticeable difference whatever.

As regards the effect of the temperature of the water, results obtained with cattle stock showed that the effect is practically nil both with reference to food consumption and to increase in weight.

282.—Connection Between Degree of Milling and the Composition and Food Value of Bran.—HONCAMP, F. and NOLTE, O., in *Landwirtschaftliche Versuchs-Stationen*, Vol. XCVI, pp. 121-142. Berlin. Summarized in *Biedermann's Zentralblatt*, Year I, Part 7, pp. 266-268. Leipzig, 1921.

Table I gives the result of the analyses of rye and wheat bran obtained with various degrees of milling. The authors fed these brans to lambs and determined the coefficient of digestibility for each constituent; the percentages of digestible nutrient substances given in Table II were thus obtained.

Table I.—Percentage compositions of brans obtained by different degrees of Milling.

	Organic matter	Crude protein	Pure protein	N-free extracts	Crude fats	Crude fibre	Ash
Wheat bran—							
Milling 75 per cent.....	94.97	17.02	15.56	65.62	4.61	7.72	5.03
Milling 83 per cent.....	93.89	17.32	15.33	62.18	5.08	9.31	6.11
Milling 94 per cent.....	95.28	15.28	13.21	62.62	4.28	13.10	4.72
Rye bran—							
Milling 65 per cent.....	96.41	15.51	13.35	74.14	3.30	3.46	3.59
Milling 84 per cent.....	96.07	16.37	14.80	70.50	3.87	4.33	4.93
Milling 94 per cent.....	92.52	19.04	17.08	57.87	4.99	10.62	7.48

Table II.—Percentage of digestible Nutrient Substances obtained by different degrees of Milling.

	Crude Protein	Pure Protein	N-free Extracts	Crude Fats	Crude Fibre	Starch value
Wheat bran—						
Milling 75 per cent.....	14.36	12.9	52.82	4.05	2.13	51.2
Milling 83 per cent.....	14.19	12.2	46.95	4.29	3.73	48.1
Milling 94 per cent.....	11.02	8.9	30.12	3.45	4.89	40.0
Rye bran—						
Milling 65 per cent.....	12.08	9.9	64.28	2.53	2.06	57.4
Milling 84 per cent.....	12.77	10.2	60.42	3.01	1.78	54.9
Milling 94 per cent.....	14.85	12.8	26.74	3.97	5.89	33.4

These data prove that the degree of milling is a good measure of the food value of a bran, the finer the milling, the lower is the value of the bran.

289.—Improvement of Dairy Cattle by Milk Control in Denmark.—FABER, H. (Agricultural Commissioner to the British Government), in *The Journal of the Ministry of Agriculture*, Vol. XXVIII, No. 7, pp. 598-607, figs. 4; No. 8, pp. 704-711, figs. 2. London, October and November, 1921.

The first Danish Milk Recording Society was instituted at Vejen, in 1895 under the name of "Vejen Kontrollo rening." The

aim of this society was to ascertain the quantity and quality of the milk yield of individual cows in order to be able to eliminate the animals that did not pay for their keep and to reserve the best cows for breeding purposes. When the Vejen Society had been working for a year, it was found that the best of the controlled cows produced a pound of butter at the cost of 6d and the poorest cow produced a pound of butter at the cost of 2s 8d.

By the law of 1902 the Danish Government made a grant not exceeding £10 to each Milk Recording Society of at least 10 members with 200 cows, on condition that the Societies

should help to form better strains of dairy cattle.

The results of the institution of Milk Control Societies were: an increase in the general average of milk production, the adoption of a more liberal feeding for cows, a selection of breeding-animals based, not as before, on external conformation alone but also on an exact knowledge of the quantity and quality of the milk produced and on the ability of the cow to transmit her character as a milk producer to her progeny.

The good results obtained by these Societies are shown by the records of those of Funen. These were founded in 1899-1900, in which year they controlled 5,467 cows, the number rising in 1915-1916 to 40,116. The average annual milk yields of all the cows (whether in milk or not) belonging to the Societies being for these two years, 6,822 lb. and 7,938 lb. respectively; the fat percentage being 3.36 and 3.55, and the butter yield 255 lb. and 323 lb. respectively.

The Danish Dairy Farmer breeds his own cattle; he adopts in-breeding or line-breeding, thereby forming families.

Family herd-books are a special feature of Danish cattle-breeding, their value depending to a great extent on the work of the milk-recording societies. These herd-books have proved that the greater the number of high yielding animals a cow can count among her ancestors, the more likely she is to transmit the quality of high yield to her offspring. The author reproduces two specimen pages of the Book of Record Sheets on which are entered not only the cow's performance but also details relating to her ancestry and progeny. The family herd-books are not drawn up by the controller of the Milk Recording Societies, but by the Agricultural Advisers appointed by the Agricultural Societies or the Joint Committees of Breeding and Milk Recording Societies. The State pays part of the salaries of these advisers.

About 1880 official herd-books were started which are to some extent based on the family herd-books. These official herd-books give the description and pedigree of the animal, as well as the milk and butter production in the case of a cow, and the performance of its female progenitors in that of a bull.

In order to find herds which not only contained prominent animals but consisted of families from which a good supply of breeding stock could be obtained for the improvement of other herds, competitions were carried out for one year at a time; later, these competitions lasted two years. The first was held in Funen in 1894-1896 and the seventh in 1913-1915. Another series was begun in Sealand in 1897. The best herds were officially recognized as "Breeding-Centres."

The results obtained at Funen were as follows: *1st biennial competition*: 7 competing herds consisting of 530 cows: average annual

milk production per head 697 gallons, fat percentage 3.44—*4th competition*: 18 herds, 777 cows, 853 gallons of milk, at percentage 3.53—*7th competition*: 10 herds, 304 cows, 934 gallons of milk, fat percentage 3.83. These competitions between entire herds are a peculiarity of Danish cattle-breeding. The Government encouraged them by annual grants.

An important step forward was made when it was ascertained from the Records of the Milk Recording Societies that the capacity of yielding large quantities of milk with a high fat percentage can be transmitted through the bull to his progeny.

By the Laws on Breeding Domestic Animals (1887 and 1902) grants were made by the Government for prizes for bulls at District Agricultural Shows, under the conditions that the animals were to be kept for service in the country at least until May 1st. in the following year and that bulls 5 years old or older should be judged through their offspring. This second proviso gave rise to "Offspring Shows" which are also a special Danish feature. By this means farmers have for a number of years been encouraged to preserve good bulls for service. While in 1887, only 371 bulls were presented at the District Shows, in 1908 more than 1,200 were presented at the State Shows and as many as 250 old bulls are entered at local shows every year.

The law of 1902 offered a further grant of £750 to cattle-breeding societies "which by showing superior offspring have proved to be particularly capable of developing good strains of dairy cattle." In order to participate in this grant, the Breeding Societies must exhibit at the offspring Shows their bulls and $\frac{1}{2}$ of the total number of their cows, and at least two bulls and 24 cows. One fourth of the cows must be between one and two years old and for $\frac{1}{2}$ at least, two years' milk records must be produced. Breeding Societies have an additional claim to the grant if they have formed or are about to form tribes or families of dairy cattle producing a high yield of butter. When the law was amended in 1912, further encouragement was offered to cattle-breeding societies having many of their cows under the control of the milk-recording societies. A grant is offered for each bull belonging to a cattle-breeding society when the bull is at least $1\frac{1}{2}$ years old and has been awarded certain prizes at shows; the amount of the grant varies according to the proportion of the cows belonging to the breeding society that are being reliably controlled as to their yield of milk, butter production and consumption of fodder.

When the Milk Recording Societies had worked for a considerable number of years and had on their books some 15,000 herds including 250,000 cows or about $\frac{1}{2}$ of all the

THE AGRICULTURAL GAZETTE OF CANADA

cows in the country, a large amount of information was available.

This statistical material was worked up by the Federations of Agricultural Societies. The investigations are now carried on to a large extent by the Officers of the Provincial Federations, the Government defraying part of the cost. These records are used to determine which of the registered bulls influence the milk yield of their progeny, so that it is higher than that of the dam of the bull. Butter production is taken into special account.

Both with the Red Danish Dairy Cattle and the Jutland Breed much of the progress during recent years is due to the influence of a few bulls having remarkably strong power of transmitting higher milk yielding capacity to their progeny.

The use of milk records in the breeding of cattle both by the line-breeding and employing bulls selected as explained above, has now been carried on long enough to show definite results; this is clearly seen by comparing the yield of the herds at two different periods.

Year	Yields of milk	Fat	Yields of butter
	lb.	per cent	lb.
Red Danish Breed			
1905-1906..	8 941	3.58	356
1915-1916..	10,041	4.11	4,602
1905-1906..	9,427	3.40	356
1915-1916..	11,282	4.30	546
Jutland Breed			
1900-1901.....	5,315	3.09	183
1916-1917.....	8,175	3.87	354
1897-1898.....	5,922	3.01	196
1913-1914.....	8,538	3.84	367
Shorthorns			
1901-1902....	6,864	3.62	277
1911-1912....	10,164	4.06	460

Averaging 18 herds of all three breeds during a period of 14 years, the milk yield has been increased 26 per cent and the butter production over 50 per cent. The improvement has been general throughout the country and is not confined to the stock of eminent breeders, but extends also to that of small farmers. In the opinion of MORKEBERG: "the capacity to yield much milk and the capacity to yield rich milk are two different characters, both hereditary, but inherited the one independently of the other." If this is correct, the problem is still easier for a country where a high milk yield is the main object, than for Denmark, where a large production of butter is required.

The rules for Cattle Shows vary a little in the different provinces: the author quotes as instances some of the rules for the provincial Shows held by the Associated Agricultural Societies in Funen.

AGRICULTURAL INDUSTRIES

202.—The Practical Organization of Milk Control in Belgium.—*Bulletin de la Commission Permanents du lait*, August-September, 1921, pp. 70. Brussels.

The Permanent Milk Commission gives in this Bulletin a summary of the discussions that took place between the members of the Commission appointed to consider the question of the practical control of milk.

At the meeting on July 7, 1921, the following resolutions were unanimously passed by the members present.

"The Permanent Milk Commission after a thorough and careful study of the practical measures to be adopted for the organization of milk control in order to insure the purity and hygienic condition of milk which plays so important a part in the preservation of public health, has come to the following conclusions:

(1) It is most desirable that Public Administrations and Agricultural Societies should increase and encourage cow-shed competitions. It would be well to resume the keeping of herd-books.

(2) All milk control should be founded upon the veterinary inspection of cow-sheds and milch cows, in accordance with the royal decree based on the findings of the Permanent Milk Commission.

The Permanent Milk Commission is further of opinion:

(a) that with assistance and under the supervision of the public authorities, a group of milk producers should be formed of which the members should voluntarily subject their cows and cow-sheds to inspection. The milk of these cows should be tested from the hygienic, chemical and bacteriological standpoints. The producer of pure wholesome milk should receive remuneration

for this control, and this remuneration should be adequate and of a public character.

(b) that the governing bodies both official and private, of hospitals, crèches and day-nurseries, etc., should forbid the use in their institutions of all untested milk, or of any milk coming from dairy farms where the premises are not subjected at least to veterinary inspection.

(c) that the above mentioned institutions should be provided with the plant necessary for keeping milk fresh and in good condition."

205.—Storage of Potatoes, Comparative Effects of Light and Darkness.—MAUPAS, A., in *Journal d'Agriculture Pratique*, Year 85, Vol. II, No. 50, pp. 498-499. Paris, Dec. 17, 1921.

As the result of the statement made by NOFFE to the effect that it is more advantageous to store potatoes in darkness than exposed to the light, conditions otherwise being equal, PAROW made comparative experiments with the object of elucidating this question. The details of his work are given in NAGEL's report in the *Zeitschrift für Spiritus-Industrie*, Berlin. The following résumé is here made by the author.

Two lots of potatoes, of absolutely identical character, weighing 11 lb. each, were placed in a cool 48° F. dry open spot on January 11, 1918 and allowed to remain there until July 22. One of these lots was placed in an open case and consequently was exposed to light, the other was placed in a closed case, i.e. in darkness.

The potatoes were weighed and analysed at the beginning and end of the experiment and from the reports made, the following results are distinctly worthy of note.

After 6 months storage	Open case %	Closed case %
Loss on gross weight of tubers.....	17.20	14.00
Loss of starchy content of potatoes.....	21.86	15.25
Loss of sugar content of potatoes.....	80.00	60.00

It is already recognized that the loss in dry matter from tubers stored in a cellar or silo from the beginning of the germination period (end of the winter) is greater than the loss resulting solely from respiration. On the contrary, light retards germination and may assist in restricting the loss of starch content which accompanies the process and results from the formation of diastases; darkness is on the other hand, useful previous to germination, that is to say, it acts only as a contradictory element as regards the losses provoked by respiratory phenomena.

Contradictory results have hitherto been obtained through not making a sufficiently

clear distinction between diastatic and respiratory phenomena.

206.—Transport of Market Produce by Aeroplane.—JAUMAIN, E., in *Revue Horticole belge*, Year 2, No. 12, pp. 169-170. Huy, Dec. 1, 1921.

The author states that where it is possible to utilize an aeroplane service for the carriage of produce as at London, Paris, Brussels, Amsterdam, this form of transport is superior to the railway for high priced flowers such as orchids, lilies, roses, etc. Although the cost of air transport is comparatively high, it is certain that the flowers will reach their destination fresh and undamaged and that consequently they will fetch a higher price.

At the present time an air service for goods has been established between Brussels, Rotterdam, Amsterdam, Paris and London: the journey from Brussels to Rotterdam takes one hour 10 minutes; from Rotterdam to Amsterdam, 30 minutes; from Brussels to London, three hours 30 minutes.

PLANT DISEASES

209.—The Efficacy of Fungicidal Dusts for the Control of Wheat Smut (*Tilletia Tritici*).—MORETTINI, A., in *Le Stazioni sperimentali agrarie italiane*, Vol. LIV, Parts 7-10, pp. 293-315. Modena, 1921.

Prophylactic experiments against wheat smut (*Tilletia Tritici*) have been carried out since 1920 at the Casalina Agriculturists' Section of the "R. Istituto superiore agrario sperimentale" of Perugia. The object of these experiments was to test the efficacy of the time-honoured copper sulphate treatment as compared with the dry or powder method. In addition to the copper sulphate dust, "polvere Caffaro" was also used. The physical character and chemical composition of this powder seem likely to produce good results. By way of experiment the Caffaro powder was mixed with water in the proportion of 1 and $\frac{1}{2}$ per cent. Its reaction being slightly acid renders superfluous the second lime-milk bath in the case of wheat seed that has been already treated by the fungicide. In the control copper-sulphate treatment, a $\frac{1}{2}$ per cent solution of Cu SO_4 was used. The grain was immersed for 15 minutes, and then immediately neutralized with milk of lime. After treatment, the seeds were left to dry in the usual manner.

The powder treatment was carried out in glass balls with a capacity of 500 cc. in which the diseased wheat was placed together with the necessary amount of the fungicide and shaken for 3 or 4 minutes.

Both the copper carbonate dust and the "polvere Caffaro" were used in doses increasing from 2 to 15‰. With 2‰ of copper carbonate, there remained, after shaking

for 3 or 4 minutes only slight traces of the fungicide, but with larger amounts the residuum increased in proportion to the ‰, even after the seed had been repeatedly immersed. With "polvere Caffaro" the residuum exceeded 3 ‰. Although this powder is impalpable like the copper sulphate dust, it adheres much more closely to the seeds. Naturally the adherence of the two fungicides, when they are equally fine, depends upon the variety of wheat and its hygrometric condition. Some of the seed was treated 20 days before sowing, and the rest the day it was put in the ground. A sample of each lot of seed was taken, in order to determine its germinating capacity immediately after treatment, and at the end of some months. The same measures were adopted in the case of the seed treated with copper sulphate and "polvere Caffaro" (after soaking in water) and the results of the two fungicides were compared.

The wheat used in every case was the hybrid Passerini which had been sorted by machine and contained some crushed and damaged seeds.

In the first series of experiments the wheat was thickly dusted with the spores of *Till. Tritici*, so that the whole mass was of a brownish colour. Practically it would be difficult, if not impossible, to meet with seed infected to this extent, for the mechanical processes of winnowing and sorting partially clean the caryopsids. The experiment was, however, useful from the research standpoint.

In a second series of experiments the wheat was infected with fewer spores and the conditions more nearly resembled those that actually exist under ordinary conditions.

The principal points to be determined were: (1) the effect of the fungicides upon the germinating capacity and energy of the seed; (2) their effect upon wheat smut; (3) their influence on yield.

The following conclusions were drawn from these experiments:

(1) The usual treatment with $\frac{1}{2}$ per cent copper sulphate which consisted in soaking the seeds in the solution for 15 minutes and removing the acidity of the copper sulphate by means of lime, has no perceptibly injurious effect upon germinating power or energy.

(2) The application of powder, whether copper sulphate dust or "polvere Caffaro" in the proportion of 2 to 6 ‰ had the same effect upon the germinating power of the wheat. Other factors being equal, the germination was improved.

(3) In the case of wheat seeds that have been intentionally and excessively infected with the spores *Till. tritici*, treatment for 15 minutes with a $\frac{1}{2}$ per cent solution of copper sulphate is more efficacious in destroying the fungus, than the application of 2-4-6 ‰ of copper carbonate or "polvere

Caffaro." The same applies to the strong doses, viz., those from 10 to 15 ‰.

(4) On the other hand, where the wheat was less infected, though to a degree much exceeding any infection that could occur naturally, the dusting treatment is more efficacious; 3 ‰ carbonate of copper having a greater effect on the fungus than spraying with copper sulphate, while 4 ‰ "polvere Caffaro" is slightly less efficacious.

(5) "Polvere Caffaro" used in the proportion of 4 ‰ is a little less active than copper carbonate, but does all that is required.

(6) Dusting, whether with copper carbonate, or "polvere Caffaro" is equally efficacious if done on the day of sowing; it has no injurious action even if carried out eight months previously.

(7) "Polvere Caffaro" mixed with water in the proportion of $\frac{1}{2}$ per cent and applied for 15 minutes behaves like a similar solution of copper sulphate and renders superfluous any neutralizing treatment with lime.

As regards the practical carrying out of the dusting treatment, whether copper sulphate or "polvere Caffaro" are used, the success achieved on a small scale by mixing the infected seed and the fungicide in little glass balls would seem to show that good results might be obtained with some adaptation of ordinary movable churns or similar apparatus, or even of simpler and cheaper appliances. The churn should be three-quarters filled with wheat and the fungicide, so that a few turns of the machine are enough to mix them thoroughly. Such an apparatus can be worked by machinery like the sorters used in the mechanical sorting of seeds. In the case of small quantities of wheat, use can be made of little barrels containing less than 1 hectolitre and with an opening allowing the wheat to be quickly introduced and removed. The wheat and the fungicide can be thoroughly mixed by simply rolling the barrel.

The author is, however, of opinion that further experiments are required, both for determining the efficacy of fungicidal dusts in preventing the attacks of *Till. tritici*, and for testing the best apparatus for carrying out the treatment.

215.—Artificial Production of "Tipburn" of Potatoes.—FENTON, F. A., and RESSLER, I. L. in *Science*, New Series, Vol. LV, No. 1411, p. 54. Utica, N.Y., Jan. 13, 1922.

Experiments conducted at the Iowa Experiment Station have shown that the Rhynchote *Empoasca mali* (potato leaf-hopper) is the factor concerned with the production of "tipburn" or "hopperburn" of the potato. Emulsions were made by crushing a large number of adults of both sexes in water and small quantities injected into the leaves of potato plants; in a few days the injury was apparent, similar to, if not

identical with "tipburn." Difficulty was experienced in introducing large amounts of the emulsion into the leaf tissue, but enough was injected to induce the change. When the emulsion was placed on the leaf and the tissue pricked with a fine needle negative results were obtained. Emulsion made from crushed nymphs failed to cause damage except in a few cases, and even then it was not pronounced.

That these insects contain some toxic substance was further demonstrated by placing the residue left over from the insects after the emulsion had been poured off on

leaf petioles and then inoculated by means of a fine scalpel. In every case a lesion was produced, the tissue at these points first turning yellow and then brown. Later the cells collapsed, leaving a fairly large scar.

Although Bordeaux mixture is toxic to the nymphs, it works comparatively slowly so that by keeping a leaf sprayed with this compound colonized by live nymphs, "tipburn" was produced. This would appear to show that Bordeaux mixture does not prevent "tipburn" by its action on the leaf but rather by its action on the insect.

OTHER ARTICLES ON SCIENCE AND PRACTICE OF AGRICULTURE

On account of lack of space the following articles in the International Review of the Science and Practice of Agriculture can only be referred to. Anyone desiring the articles may obtain them from the Institute Branch, Department of Agriculture, Ottawa.

144.—The World's Nitrogen Products.—*Journal of the Society of Chemical Industry*, Vol. XL, No. 15, pp. 285-287. London, August 15, 1921.

145.—The Condition of the Nitrogenous and Phosphatic Fertilizer Industries in Germany.—UNGEWITTER, in *Chemiker-Zeitung*, Year XLV, No. 147, p. 191. Cöthen, December 8, 1921.

151.—Experimental Researches on the Factors Determining Resistance to Co'o'ing in Leguminosae and on the Means Employed to Remedy This Defect.—DE DOMINICIS, A., in *Annali della R. Scuola Superiore di Agricoltura in Portici*, S. II. Vol. 16, p. 31. Portici, 1920.

152.—A Contribution to the Determination of the Cause of the Formation of Bacteroids in the Nodules of the Leguminosae.—BARTHEL C., in *Annales de l'Institut Pasteur*, Vol. XXXV, No. 10, pp. 634-646. Paris, October, 1921.

154.—Genetic Behaviour of the Spelt Form in Crosses Between Triticum Spelta and Triticum Sativum. The Possibility of Obtaining Synthetic Forms of Wheat by Crosses Between Two Spelts.—LEIGHTY, C. E., and BOSHNALKIAN, S., in *Journal of Agricultural Research*, Vol. XXII, No. 7, pp. 335-364. Washington, November 1921.

157.—Production of Varieties of Bean With Mottled Seeds.—BLARINGHEM, L., in *Comptes Rendus de l'Académie des Sciences*, Vol. 173, No. 16, pp. 666-668. Paris, October, 1921.

159.—Varietal Trials With Spring Wheat in North Dakota, U.S. Comparative Grain Yields and Milling and Baking Qualities.—STOA, T. E., in *Bulletin 149, Agricultural Experiment Station, North Dakota Agricultural College*, pp. 1-55. August, 1921.

167.—Piedmont Hemp.—DOLCI, E., in *La France et le marché Italien, Organe de la Chambre de Commerce Italienne à Paris*, Year XXXVI, Nos. 245-247, pp. 291-293. Paris, July-September, 1921.

169.—Giant Grasses for Paper Making in India, Africa, Australia and the West Indies.—In *Bulletin of the Imperial Institute*, Vol. XIX, No. 2, pp. 174-189 and Vol. XIX, No. 3, pp. 271-282. London, 1921.

183.—A Calculation of the Amount of Food Necessary for Stock, Especially When Grazing, Per 500 kg. of Live Weight.—HOLDFLEISS, P., in *Deutsche Landwirtschaftliche Presse*, Year XLVIII, No. 94, p. 693. Berlin, November, 1921.

192.—The Gascon and Lauraguaise Breeds of Pigs in France.—GIRARD, Les races Porcines meridionales, in *Revue Vétérinaire*, Vol. LXXIII, 3rd series, Vol. 11, pp. 82-95 and 466-485. Toulouse, February and April 1921.

193.—Use of Forage Crops in the Fattening of Pigs. Experiments in the United States.—ROBISON, W. L., in *Ohio Agricultural Experiment Station, Bulletin No. 343*, Pages 165-222, table 24. Wooster, Ohio, June, 1921.

200.—Apple Packing Houses in the North Western Districts of the United States.—PAILTHORP, P. R., and SAMSON, H. W., in *Farmer's Bulletin No. 1204*, United States Department of Agriculture, pp. 3-39. Washington, D.C., June, 1921.

THE AGRICULTURAL GAZETTE OF CANADA

- 203.—A Method for Detecting the Admixture of Goats' Milk to the Milk of Cows.—AUSTEN, W., in *Deutsche Schlacht und Viehhof Zeitung*, Year XXI, No. 25, p. 211. Berlin, 1921.
- 208.—Red Currant Varieties Comparatively Resistant to American Gooseberry Mildew (*Sphaerotheca Mors-Uvae*) in England.—SALMON, E. S., and WORMALD, H., in *The Gardner's Chronicle* (Third Series), Vol. LXX, No. 1804, p. 47. London, July 23, 1921.
- 226.—The Present Position of Research in Agriculture in Great Britain and Suggestions as to the Best Methods of Application to Practical Farming.—I. HALL, Sir A. D. (Chief Scientific Adviser and Director General of Intelligence Department, Ministry of Agriculture), The Present Position of Research in Agriculture, in *Journal of the Royal Society of Arts*, Vol. LXIX, No. 3567, pp. 300-312. London, April, 1921.—II. VOELCKER, J. A., How Best to Utilize the Results of Agricultural Research in Practical Farming, in *Journal of the Farmers' Club*, Pt. 6, pp. 109-129. London, Nov., 1921.
- 227.—Report of the "Imperial Economic Botanist" Pusa, India, 1920-21, With Reference to Wheat, Tobacco, Fibre Plants, Oil Seeds, Grain, and Indigo, Including Physiological Investigations.—HOWARD, G. L. C., in *Scientific Reports of the Agricultural Research Institute, Pusa*, 1920-21, pp. 8-20, Pl. II, bibliography of 7 works. Calcutta, 1921.
- 228.—The New Service of Agricultural Ecology in Italy.—*Nuovi Annali del Ministero per l'Agricoltura*, Year I, Part 2, pp. 395-398. Rome, December, 1921.
- 229.—Experimental Researches on the Critical Period of Wheat, as Regards Rainfall in Italy.—AZZI, G., *Nuovi Annali del Ministero per l'Agricoltura*, Year I, No. 2, pp. 299-307. Rome, December, 1921.
- 235.—The Spring Awakening of Arable Land and the Choice of Agricultural Machines.—RINGELMANN, M., in *Journal d'Agriculture Pratique*, Vol. 35, No. 7, pp. 132-135. Paris, February 19, 1921.
- 239.—The Recent Conference at Rotterdam and the Future Prospects of Nitrate of Sodium.—*Caliche*, Year III, No. 9, pp. 420-431. Santiago (Chile), December, 1921.
- 244.—The Inheritance of the Character "Yellow Striping of Leaves" in the Oat.—CHRISTIE, W., in *Zeitschrift für Indukative Abstammungs und Vererbungslehre*, Vol. XXVII, Part 2, pp. 134-141. Leipzig, December, 1921.
- 250.—Male-Sterility in Flax, Subject to Two Types of Segregation, Ambilateral and Unilateral. BATESON, W., and GAIRDNER, A. E., in *Journal of Genetics*, Vol. II, No. 3, pp. 269-275. Cambridge, December 1921.,
- 259.—A New Fodder Grass From Uganda, *Pennisetum Polystachyum*.—In *Bulletin of the Imperial Institute*, Vol. XIX, No. 3, pp. 295-296. London, 1921.
- 272.—Helenium Hoopesii, a Poisonous Plant Harmful to Stock in Utah, U.S.—MARSH, D. W., CLAWSON, A. B., COUCH, J. F. and MARSH H., in *United States Department of Agriculture, Bulletin No. 947*, pp. 1-46. Bibliography of 13 works. Washington, D.C., Oct. 11, 1921.
- 278.—Summary of Experiments on Foot-and-Mouth Disease in France.—ROUX, E., VALLEE, H., CARRE, H. and NOCARD in *Comptes Rendus de l'Académie des Sciences*, Vol. 173, No. 23, pp. 1141-1145. Paris, December, 1921.
- 281.—Hay Made From Liberally Fertilized Young Grass, a Farm-Grown Concentrated Food.—I. NEUBAUER, in *Biedermann's Zentralblatt*, Year 4, Part 7, pp. 272-275. Leipzig, July, 1921.—II. HUTTINGER, in *Deutsche Landwirtschaftliche Presse*, Year 49, No. 1, pp. 1-2. Berlin, January 4, 1922.
- 283.—Colour Inheritance in Mammals and Domestic Birds.—PORCHEREL, A., in *Revue Vétérinaire*, Vol. LXXII, No. 9, pp. 541-548; No. II, pp. 680-690. Toulouse, Sept. and Nov. 1921.
- 285.—Measurement of the Cutaneous Surface of the Horse.—ROUSSY, B., in *Comptes Rendus de l'Académie des Sciences*, Vol. 174, No. 3, pp. 195-196. Paris, January 16, 1922.
- 288.—The Cattle Industry of Cuba.—NEVILLE, H. O., in *The Cuban Review*, Vol. XIX, No. 9, pp. 13-16, figs. 18. New York, August, 1921.
- 295.—Experiments in Rearing Sheep and Goats in the United States.—I. JONES, J.M., BREWER, R. A. and DICKSON, R.E. in *Texas Agricultural Experiment Station, Bulletin No. 269*, p. 13. College Station, 1920. II. MAGEE, W. T. and DARLOW, A. E. in *Oklahoma Agricultural and Mechanical College, Agricultural Experiment Station, Bulletin No. 133*. Stillwater, Okla., 1920.—III. MILLER, E. C. in *The Breeders' Gazette*, Vol. LXXI, No. 5-2095, pp. 139-140. Chicago, February 2, 1922.
- 304.—Condition of Motor-Cultivation in rmany.—I. MARTINY, in *Mitteilungen*

THE AGRICULTURAL GAZETTE OF CANADA

- der Deutschen Landwirtschaft-Gesellschafts.* No. 25, pp. 391-394; No. 26, pp. 405-409 Berlin, June 18 and 25, 1921.—II. COLSMAN, *Ibidem*, No. 27, pp. 420-422. July 2, 1921.—III. CLEVE-GRAUHOFF, *Ibidem*, No. 27, pp. 422-423.—IV. KAUL, W., *Ibidem*, No. 27, pp. 423-425.
- 315.—Motor-Plough for Ploughing on the Flat.—DESSAISALX, R., in *Journal d'Agriculture Pratique*, Vol. 36, No. 38, p. 253. Paris, September 24, 1921.
- 331.—Investigations on Potato Storage During the Hot Season in Western India.—MANN, H. H. and NAGPURKAR, S. D., in *Investigations on Potato Cultivation in Western India*, Bulletin No. 102 (of 1920), Department of Agriculture, Bombay, 1921.
- 333.—Causes of Inferiority of Manila Hemp Fibres—(*Musa Textilis*) in Recent Consignments.—*Bulletin of the Imperial Institute*, Vol. XIX, No. 2, pp. 127-132. London, 1921.

THE INTERNATIONAL REVIEW OF AGRICULTURAL ECONOMICS

The following is a brief indication of the contents of the more important articles in the September and October numbers of the Institute Bulletin. Persons interested in any of the articles may obtain the original bulletin on application to the Institute Branch, Department of Agriculture, so long as the supply for distribution is not exhausted.

September

Co-operation for the Marketing of Agricultural Produce and the Supply of Farm Requisites in Canada.—34 pages. The second half of a very comprehensive article on co-operative marketing in this country. In this installment the author deals with the co-operative marketing of eggs and poultry; the co-operative marketing of fruits and vegetables; the co-operative sale of tobacco, the marketing of seed, the co-operative preserving of fruits; and the co-operative purchase of agricultural requisites in the different provinces.

Other articles in the September number are: The German Federation of Agriculture, Labourers and Employers; Co-operation in the Sale of Eggs and Poultry in Great Britain; the Swiss Peasants Union; Co-operation for the sale of Tobacco in Kentucky; The Land and Agricultural Bank of South Africa; Agricultural Undertakings of the Russian Refugees in Yugoslavia; The Legal Position of Agricultural Labourers in Germany; The Consolidation of Holdings in the Devastated Regions in France; The Distribution of Electric Energy in the Country Districts of France.

October

Agricultural Co-operative Purchasing Societies in Italy.—12 pages. The joint purchase of raw materials and of agricultural requisites—one of the most important branches of

co-operation—is carried on in Italy by different types of societies: associations of a technical nature, agricultural unions, rural banks, and agricultural consortia.

The most important of these groups is the one consisting of the agricultural consortia, the development of which is in close connection with the importance assumed by the employment of machines and of chemical fertilizers in agriculture. These consortia are organized in the form of co-operative societies with limited liability usually with an area of operations restricted to a single district (*circondario*). Their purpose is to purchase directly either individually or in association with other societies or through the medium of their federation, all raw materials and means of production necessary locally for the carrying on of agriculture, exercising at the same time strict supervision, so as to guarantee the quality of the goods to the members who purchase them.

In the present article the figures and the information necessary to indicate the position reached by the agricultural co-operative consortia in 1920 are given.

The Economic Organization of Agriculture in Brazil.—32 pages. The author deals with the subject under the following heads: colonization; the "fazendas" (large agricultural undertakings run on industrial lines, usually for the production of coffee); agricultural credit; agricultural co-operation; social legislation; agricultural instruction and technical aids to agriculture.

Other articles in the October number are: The Italian National Credit Institute for Co-operation; The Italian Bank of Labour and Co-operation; Prevalence of Tenant Farming in Germany; The Result of the Agrarian Reform in Poland; Measures Taken in Poland for Bringing Waste Land under Cultivation; Allotments in France During the War.

AGRICULTURAL STATISTICS THE WORLD'S LIVE STOCK

The following tables give the numbers of horses, cattle, sheep and swine in the different countries in the years 1911, 1914 and 1918 to 1922, including census data or those of available annual statistics. The figures for some of the countries of Europe are not strictly comparable from year to year on account of territorial changes since the war, but taken as a whole, the tables furnish bases for ascertaining the fluctuations in number of live stock during the last ten years for separate countries.

It should be observed that for some countries the data of the numbers of live

stock per 1,000 inhabitants are not strictly exact, for the reason that the dates of censuses and other statistics of live stock differ from those fixed for the population returns.

In the remarks following the four tables the total numbers of live stock in the different continents in the years nearest 1911 and 1921 are given as well as the numbers per 1,000 inhabitants.

All the data used in this statement have been taken from the publications of the International Institute of Agriculture which is supplied with official live stock statistics by nearly every country.

HORSES

Thousands

Countries	1922	1921	1920	1919	1918	1914	1911	Number per 1,000 inhabitants	
								in year nearest 1921	in year nearest 1911
<i>Europe:—</i>									
Great Britain and Ireland.....		2,165	2,213	2,233	2,213	2,237	2,253	46.7	49.8
France.....		2,706	2,635	2,503	2,233	2,205	3,236	67.2	81.7
Belgium.....		222	205	162			262	29.8	35.3
Netherlands.....		364		362	378		327	53.2	55.9
Norway.....					221	182	168	83.5	70.1
Sweden.....				716	715	603	588	122.4	101.1
Denmark.....	576	598	602	558	545	567		183.0	194.1
Spain.....				594	577	525	546	27.9	27.4
Roumania.....			1,485	1,380			825	82.5	114.0
Greece.....			201		186	64	149	37.2	56.6
Germany.....		3,683	3,588	3,503	3,426	3,435	4,523	61.5	69.7
Switzerland.....		134	130	124	129		144	34.7	38.3
Czecho-Slovakia.....			581					42.8	
Russia-in-Europe.....			17,718			25,292	24,795	177.2	179.3
<i>America:—</i>									
Canada.....	3,649	3,813	3,400	3,667	3,609	2,948	2,596	434.8	360.2
United States.....	19,056	19,208	19,766	21,482	21,555	20,962	20,277	181.7	220.5
Mexico.....				929				61.3	
Argentina.....					8,823	8,324	8,894	1,014.3	1,191.0
Brazil.....					6,065		7,290	197.9	303.6
Chile.....				392	411	458	352	103.2	103.1
<i>Asia:—</i>									
British India.....			1,699	1,688	1,681	1,644	1,565	6.2	6.5
Japan.....				1,480	1,511	1,579	1,576	26.4	30.6
China.....						4,934		10.0	11.3
Russia-in-Asia.....			6,905	8,755		9,681	9,760	384.9	380.6
<i>Africa:—</i>									
Algeria.....						203	227	33.7	40.8
Egypt.....		34	33	31	30	40	51	2.6	4.3
Morocco.....		65	139	125	119			11.9	21.5
Tunis.....				79	36	35	39	37.7	20.3
South Africa.....			690	695	781			99.7	120.4
<i>Australasia:—</i>									
Australia.....				2,421	2,527	2,521	2,278	445.5	511.4
New Zealand.....	332	337	346	363	378		404	262.6	377.5

THE AGRICULTURAL GAZETTE OF CANADA

CATTLE

Thousands

Countries	1922	1921	1920	1919	1918	1914	1911	Number per 1,000 inhabitants	
								in year nearest 1921	in year nearest 1911
<i>Europe:—</i>									
Great Britain and Ireland.....		11,893	11,775	12,491	12,311	12,184	11,866	251.2	262.4
France.....		13,343	13,217	12,789	12,251	12,668	14,436	337.1	364.5
Belgium.....		1,515	1,487	1,286			1,812	203.1	244.1
Netherlands.....		2,063		1,969	2,049		2,027	301.5	346.0
Norway.....					1,050	1,146	1,134	396.6	474.0
Sweden.....				2,551	2,584	2,758	2,690	436.3	487.0
Denmark.....	2,525	2,591	2,504	2,188	2,124	2,463		792.9	817.5
Spain.....				3,397	3,174	2,743	2,541	159.6	127.4
Portugal.....		741						115.7	118.0
Italy.....					6,240	6,646		169.8	178.8
Roumania.....			4,895	4,634			2,667	262.8	368.6
Greece.....			660		649	331	298	122.1	113.4
Germany.....		16,840	16,807	16,523	18,579	21,829		281.3	310.8
Switzerland.....		1,425	1,382	1,433	1,531		1,443	369.0	383.4
Czecho-Slovakia.....			4,212					309.8	
Russia in Europe.....			28,383			37,485	37,317	283.8	269.9
<i>America:—</i>									
Canada.....	9,820	10,206	9,572	10,085	10,046	6,037	6,533	1,163.5	906.6
United States.....	65,652	65,587	67,120	68,560	67,422	56,592	60,502	620.4	657.8
Mexico.....			2,163					142.7	
Argentina.....			27,392			25,867	28,786	3,149.1	3,854.7
Brazil.....					28,962		30,705	945.1	1,278.8
Chile.....				2,163	2,225	1,969	1,640	569.9	480.3
British Guiana.....			86	79	77	90	81	279.7	252.2
Dutch Guiana.....				10	10	8	7	95.0	74.4
Paraguay.....					5,500	5,249		5,500	5,832.3
<i>Asia:—</i>									
British India.....			127,119	129,591	129,876	124,965	103,595	449.9	428.8
Japan.....				1,345	1,307	1,387	1,405	24.0	27.3
China.....						21,997		36.2	50.2
Russia in Asia.....			9,490		12,609	14,567	14,305	529.1	557.8
Ceylon.....				1,599	1,451	1,484	1,465	336.1	356.5
<i>Africa:—</i>									
Algeria.....						1,992	1,114	176.1	200.2
Egypt.....		596	562	505	517	601	656	46.3	55.4
Tunis.....				635	254	189	191	303.2	98.8
Morocco.....		1,300	1,494	1,322	1,173	675		242.5	139.4
South Africa.....			5,975	5,575	6,852		5,797	989.8	970.5
Madagascar.....		7,829	7,519	7,277	7,055	5,845	4,573	2,120.6	1,450.2
<i>Australasia:—</i>									
Australia.....				12,711	12,739	11,052	11,829	2,338.0	2,655.2
New Zealand.....	3,323	3,139	3,102	3,035	2,869		2,020	2,444.7	11,886.4

SHEEP

Thousands

<i>Europe:—</i>									
Great Britain and Ireland.....		24,274	23,404	25,119	27,063	27,964	30,480	512.8	674.0
France.....		9,600	9,406	9,022	9,061	14,038	16,425	239.9	414.8
Netherlands.....		668		437		642	889	97.7	151.8
Norway.....					1,207	1,327	1,398	456.5	584.7
Sweden.....				1,563	1,409	993	946	267.4	171.2
Denmark.....	442	522	539	509	470	516	727	159.7	263.3
Spain.....				19,337	17,735	16,128	15,726	906.8	788.2
Italy.....					11,754	13,824		319.9	322.0
Roumania.....			8,690	7,791			5,269	482.8	728.3
Greece.....			5,811		5,468	2,614	3,545	1,076.2	1,347.1
Germany.....		5,882	6,150	5,373	5,997	5,471	5,803	98.3	89.4
Switzerland.....		244	241	265	230		161	63.3	42.9
Czecho-Slovakia.....			976					71.8	
Russia-in-Europe.....			36,065			43,111	35,789	360.7	331.1
<i>America:—</i>									
Canada.....	3,263	3,676	3,721	3,422	3,053	2,058	2,175	419.0	301.8
United States.....	36,327	37,452	39,025	48,866	48,603	49,719	53,633	354.3	583.1
Mexico.....			1,090					71.9	
Argentina.....			45,309		44,855	43,225	80,401	5,208.9	10,766.3
Brazil.....					7,205		10,550	235.1	439.4
Chile.....				4,500	4,434	4,602	3,538	1,185.5	1,035.9

THE AGRICULTURAL GAZETTE OF CANADA

SHEEP—Concluded

Countries	1922	1921	1920	1919	1918	1914	1911	Number per 1,000 inhabitants	
								in year nearest 1921	in year nearest 1911
<i>Asia:—</i>									
British India.....			21,984	22,865	22,895	23,081	23,281	108·8	96·4
China.....					22,232	22,186		50·4	50·6
Russia-in-Asia.....			14,478		20,432	29,162		807·1	789·1
<i>Africa:—</i>									
Algeria.....						9,139	8,529	1,541·1	1,532·9
Morocco.....		6,600	6,710	5,080	4,194			1,332·7	767·9
Tunis.....				2,662	1,124	692	687	1,271·1	354·2
South Africa.....			26,289	28,492	29,914		30,657	5,132·2	3,797·4
Madagascar.....			300	221	274		295	84·6	93·5
<i>Australasia:—</i>									
Australia.....				75,554	87,086	78,600	93,004	13,896·8	20,876·2
New Zealand.....	22,222	23,285	23,915	25,828	26,538	24,798	23,996	13,131·5	22,407·2

SWINE

Thousands

Countries	1922	1921	1920	1919	1918	1914	1911	Number per 1,000 inhabitants	
								in year nearest 1921	in year nearest 1911
<i>Europe:—</i>									
Great Britain and Ireland.....		3,639	3,116	2,925	2,809	3,953	4,250	76·9	94·0
France.....		5,166	4,942	4,389	3,981	5,926	6,720	126·0	169·7
Belgium.....		976	977	770			1,229	100·8	165·6
Netherlands.....		1,519		450	600		1,260	222·1	215·1
Norway.....					214	228	334	81·0	139·5
Sweden.....				717	634	1,015	951	122·6	172·2
Denmark.....	1,899	1,430	1,116	716	621	2,497	1,468	437·6	532·4
Spain.....				4,434	4,107	2,810	2,472	208·3	123·9
Portugal.....			921					144·0	184·7
Italy.....					2,339	2,722		63·7	72·3
Roumania.....			2,514	2,289			1,021	139·6	141·2
Germany.....		15,876	14,179	11,594	10,911	25,341	21,924	265·2	537·7
Switzerland.....		639	546	465	366		570	165·4	151·4
Czecho-Slovakia.....			2,015					148·2	
Russia-in-Europe.....			12,272			12,903	12,323	122·7	89·1
<i>America:—</i>									
Canada.....	3,916	3,905	3,517	4,040	4,290	3,434	3,610	445·2	501·0
United States.....	57,834	56,097	59,344	74,584	70,978	58,933	65,620	530·7	713·5
Mexico.....			1,654					109·1	
Argentina.....			3,227		3,260	2,901	2,900	371·0	388·3
Chile.....				292	326	221	160	77·0	46·9
Venezuela.....			512		501			212·3	182·7
<i>Asia:—</i>									
Japan.....				470	398	332	299	8·4	5·8
China.....						76,819		101·3	175·2
Philippines.....				3,130	2,894	2,286	1,662	302·4	217·7
Russia-in-Asia.....			2,588		3,503	2,092	1,765	144·3	68·8
<i>Africa:—</i>									
Madagascar.....				321	486	666	600	282·0	190·3
Morocco.....		130	134	128	103			23·8	3·2
South Africa.....			560	724			1,082	80·9	181·1
<i>Australasia:—</i>									
Australia.....				696	914	862	1,111	128·0	249·3
New Zealand.....	385	350	267	235	259		349	272·5	325·7

THE AGRICULTURAL GAZETTE OF CANADA

In the International Year Book of Agricultural Statistics, published by the Institute, a series of tables are given containing a summary of the data for the principal species of live stock at the dates nearest 1911 and 1921 and a comparison of numbers compared with population and areas.

From these tables in the Year Book the world's situation with respect to the num-

bers of the principal species, as shown by the statistics approximate to 1921 and the resulting alterations in comparison with those approximate to 1911, alike in actual numbers, in relation to population, and to area, may be summed up as in the following table. In these tables the data for a large number of countries not mentioned in the four previous tables are included.

Species	Number of live stock according to statistics approximating 1921			Increase (+) or decrease (-) compared with statistics approximating 1911		
	Actual figures	Per 1,000 inhabitants	Per 1,000 acres	Actual figures	Per 1,000 inhabitants	Per 1,000 acres
	Million head	Head	Head	Million head	Head	Head
Horses...	99.8	58.7	3.8	-10.7	- 8.6	-0.3
Cattle.....	510.9	295.7	18.7	+28.1	+ 4.9	+1.4
Sheep.....	532.2	325.9	20.0	-85.6	-63.8	- 2.8
Swine.....	209.7	155.9	7.9	-50.5	-45.3	-1.7
Goats.....	116.8	114.9	5.7	- 9.2	-9.3	-0.2

Excepting in the case of cattle, there is obviously a decrease more or less important in all the species, in actual numbers, and in relation to those per 1,000 inhabitants and per 1,000 acres.

It is of interest to observe in detail for each species the variations from year to year in different countries and in the totals for the continents. It should be remembered that in every case where a total for a continent is mentioned, many more countries are taken into consideration than are given in the four tables above. These countries were omitted from the tables on account of lack of available data or on account of their lack of importance from the point of view of numbers of live stock.

Horses.—The table for horses shows that as regards individual countries, there have been decreases since pre-war years in nearly every country in Europe, the largest decrease being in Russia. Canada shows a steady increase and the United States a slight decrease. With respect to the number per 1,000 inhabitants, all the countries in Europe except Norway, Sweden and Spain show a decrease.

Taking the totals for continents the decrease is particularly observable in Europe, the continent having the largest number of horses: from 44,300,000 head according to statistics approximating 1911 to 38,400,000 head in the year nearest 1921.

Taking 100 as the basis of the aggregate number of horses in the years nearest 1911, the following index numbers will represent the data approximate to 1921 in each continent: Europe 86.7, North and Central America, 98.1, South America 93.3, Asia 84.0, Africa 94.8 and Oceania 102.8.

Cattle.—There are large decreases since 1914 in Germany and Russia and small decreases in the other European countries except Netherlands, Denmark and Spain. Roumania shows a considerable increase. Outside of Europe, there are large increases in Canada, the United States and Madagascar. It should be remembered that a large proportion of the cattle in India are draught animals, including buffaloes.

By continents, Asia has increased since 1911 from 163,400,000 to 182,400,000, North and Central America from 74,100,000 to 84,700,000, Africa, from 23,200,000 to 29,600,000 and Oceania from 14,100,000 to 16,100,000. In Europe there was a decrease from 127,500,000 to 122,100,000, and in South America, from 80,600,000 to 76,100,000.

Taking 100 cattle as the basis of the aggregate numbers of cattle according to statistics approximate to 1911 the following index numbers will represent the data approximate to 1921: Europe 95.8, North and Central America, 114.2, South America, 94.4, Asia 111.6, Africa 127.6 and Oceania 114.3.

THE AGRICULTURAL GAZETTE OF CANADA

The fluctuations in number per 100 inhabitants, and per 1,000 acres are as follows:

Continents	Number of cattle per 1,000 inhabitants		Number of cattle per 1,000 acres	
	At date near-est 1921	At date near-est 1911	At date near-est 1921	At date near-est 1911
	Head	Head	Head	Head
Europe.....	276.5	285.4	50.2	52.6
North and Central America.....	600.1	598.1	15.7	13.7
South America.....	1,169.1	1,526.7	16.8	17.8
Asia.....	184.7	171.0	21.6	18.2
Africa.....	352.1	310.6	6.7	5.2
Oceania.....	1,959.8	2,032.9	7.6	6.7

Sheep.—In Europe there are large decreases in Great Britain, and Ireland and in France, with increases in Spain and Roumania. Canada shows an increase and the United States a large decrease from 53,600,000 to 36,300,000. The great sheep raising countries of the Southern Hemisphere except New Zealand show very large decreases since 1911. In Australia, there is a decrease from 93 to 75 millions, in South Africa from 31 to 26 millions, and in Argentina, from 80 to 45 millions.

The decrease since 1911 is characteristic of every continent as a whole except Africa

where it is comparatively unimportant. In Europe the decline is from 167 to 153 millions, in North and Central America from 58 to 43 millions, in South America from 116 to 78 millions and in Oceania from 117 to 99 millions.

These fluctuations expressed in index numbers (100 = the number at the dates nearest 1911) are as follows: Europe 91.8, North and Central America 74.3, South America 67.6, Asia 97.3, Africa 102.3, and Oceania 84.5.

The changes in relation to population and area in each continent are as follows:—

Continents	Number of sheep per 1,000 inhabitants		Number of sheep per 1,000 acres	
	At date near-est 1921	At date near-est 1911	At date near-est 1921	At date near-est 1911
	Head	Head	Head	Head
Europe.....	347.1	374.1	63.0	68.9
North and Central America.....	298.9	460.0	7.9	10.7
South America.....	1,330.9	2,447.0	18.5	27.4
Asia.....	108.5	113.1	12.0	11.6
Africa.....	736.2	810.7	13.9	13.6
Oceania.....	12,200.2	17,143.0	47.1	55.8

Swine.—The number of swine in Germany has decreased since 1914 from 25 to 16 millions. There are decreases in several other countries of Europe and an increase in Spain. There is a slight increase in Canada and a decrease in the United States.

In every continent taken as a whole, decreases have occurred except in Africa. In Europe there is a reduction from 74 to 63 millions, in North and Central America from 72 to 63 millions, in Asia from 86 to

57 millions, in South America from 24 to 23 millions, and in Oceania from 1,500,000 to 1,100,000.

With the aid of index numbers the changes may be indicated as follows, taking 100 as representing the position nearest to 1911: Europe 85.1, North and Central America 87.1, South America 97.5, Asia 66.3, Africa 100.3 and Oceania 72.9.

The fluctuations relative to population and area are as follows:

Continents	Number of swine per 1,000 inhabitants		Number of swine per 1,000 acres	
	At date near-est 1921	At date near-est 1911	At date near-est 1921	At date near-est 1911
	Head	Head	Head	Head
Europe.....	143.2	168.8	26.0	31.2
North and Central America.....	435.1	570.7	11.5	13.2
South America.....	353.6	447.0	5.1	5.2
Asia.....	94.6	145.1	7.9	11.0
Africa.....	31.4	35.3	0.6	0.6
Oceania.....	132.6	215.7	0.5	0.7

THE AGRICULTURAL GAZETTE OF CANADA

NUMBER OF LIVE STOCK IN THE UNITED STATES

January 1st, 1923

Species	January 1st, 1923	January 1st, 1922
Horses.....	18,853,000	19,056,000
Mules.....	5,506,000	5,467,000
Milch cows.....	24,429,000	24,082,000
Other cattle.....	41,923,000	41,550,000
Sheep.....	37,209,000	36,327,000
Swine.....	63,424,000	57,834,000

AREAS SOWN TO WINTER CEREALS

The following table gives the official estimates of the areas sown last autumn to winter wheat and rye compared with the

previous year, for the countries which have so far reported to the Institute.

Countries	Wheat		Rye	
	1922-23	1921-22	1922-23	1921-22
	Acres	Acres	Acres	Acres
Belgium.....	328,000	306,000	475,000	540,000
Bulgaria.....	2,073,000	1,839,000		
Finland.....	22,000	22,000	578,000	578,000
France.....	12,989,000	11,862,000	2,149,000	2,054,000
Spain.....	10,175,000	9,922,000		
Latvia.....			658,000	583,000
Poland.....	2,362,000	2,408,000	11,476,000	11,163,000
Roumania.....	4,303,000	4,969,000		
Czechoslovakia...	1,286,000	1,374,000	2,054,000	2,160,000
Canada.....	548,000	995,000		
United States.....	46,069,000	47,592,000	5,508,000	6,210,000
India.....	29,511,000	28,234,000		
Algeria.....	1,903,000	1,903,000		
Tunis.....	1,112,000	1,112,000		
Totals.....	113,081,000	112,538,000	22,898,000	23,288,00

FOREIGN CROP CONDITIONS

(Feb. 16, 1923)

United Kingdom.—The condition of winter cereals is good. The area sown to winter wheat is officially reported as 3 per cent less than that of last year. There was a great deal of rain during January and field work was being retarded.

France.—Winter wheat and oats have a satisfactory appearance. Heavy rains in the latter part of January were making field work difficult.

Belgium.—Owing to sowings being late, winter cereals were slow in development, but later the weather was favourable to growth.

Russia.—The condition of winter cereals at the commencement of the winter was reported to be generally satisfactory. Subsequently however, the weather was unfavourable.

Roumania.—The weather has been favourable and the condition of crops satisfactory, but the large reduction in the area sown to

winter wheat makes it unlikely that there will be a surplus for export.

Jugo-Slavia.—Winter crops are in a generally satisfactory condition.

Germany.—The weather in January was unsettled, but the winter crops were showing improvement.

North Africa.—The appearance of the crops is satisfactory and moisture reserves everywhere adequate.

Italy.—The latest reports mention fine dry weather, and the crop conditions are favourable.

India.—The crop outlook generally is very favourable. There are especially good reports from the central provinces. The area of wheat is over a million acres larger than last year.

Argentina.—The corn area is 7,847,000 acres against 7,343,000 last year, but the crop has suffered greatly from the lack of rain.

THE AGRICULTURAL GAZETTE OF CANADA

IMPORTS AND EXPORTS OF WHEAT AND FLOUR

(Flour reduced to equivalent quantities of wheat)

Countries	November		Four months (August 1st to Nov. 30th)	
	1922	1921	1922	1921
	Bushels	Bushels	Bushels	Bushels
<i>Exports—</i>				
Belgium.....	34,000	67,000	214,000	193,000
France.....		76,000	723,000	613,000
Hungary.....	512,000	1,417,000	2,244,000	4,397,000
Roumania.....	652,000	381,000	814,000	2,035,000
Canada.....	60,781,000	33,106,000	128,842,000	71,986,000
United States.....	17,579,000	19,453,000	113,461,000	150,732,000
Argentina.....	5,830,000	828,000	25,979,000	5,772,000
India.....	1,900,000	119,000	2,535,000	1,228,000
Algeria.....	107,000	747,000	528,000	4,218,000
Tunis.....	11,000	183,000	122,000	1,467,000
Australia.....	1,081,000	9,992,000	7,110,000	30,643,000
Other countries (1).....	5,000	71,000	30,000	294,000
Total Exports.....	88,492,000	66,440,000	282,602,000	273,578,000
<i>Imports—</i>				
Germany.....	2,631,000	7,082,000	21,204,000	37,746,000
Austria.....	1,376,000	1,636,000	4,301,000	6,794,000
Belgium.....	2,995,000	1,943,000	14,175,000	19,165,000
Denmark.....	431,000	409,000	1,509,000	2,021,000
Finland.....	374,000	177,000	1,281,000	1,033,000
France.....		1,190,000	a11,640,000	13,137,000
Great Britain and Ireland.....	18,176,000	14,998,000	71,803,000	78,644,000
Greece.....	1,505,000	1,193,000	4,320,000	3,708,000
Italy.....	4,843,000	8,907,000	23,295,000	32,552,000
Norway.....	647,000	678,000	2,687,000	2,166,000
Netherlands.....	2,189,000	1,935,000	9,844,000	8,919,000
Poland.....	16,000	25,000	75,000	344,000
Sweden.....	910,000	434,000	2,988,000	2,221,000
Switzerland.....	2,061,000	2,367,000	6,607,000	6,122,000
Czechoslovakia.....	1,222,000	845,000	4,255,000	4,863,000
Japan.....	1,048,000	1,963,000	3,439,000	6,476,000
Egypt.....	542,000	611,000	1,764,000	2,403,000
Other countries (2).....	222,000	262,000	825,000	1,035,000
Total Imports.....	41,188,000	46,655,000	b174,372,000	229,349,000

(1) Italy and Algeria. (2) Latvia, Ceylon and Tunis. (a) Three months. (b) Not including France.

INDEX NUMBERS OF PRICE OF WHEAT

Dates	EXPORTING MARKETS				IMPORTING MARKETS					
	Canada WINNI- PEG — No. 1 Mani- toba	United States CHI- CAGO — No. 2 Winter	India KARA- CHI — Karachi white	Argen- tina BUEN. AIRES — Barletta	Germany BERLIN — Home grown	Belgium AN- TWERP — Home grown	France PARIS — Home grown	Great Britain LONDON — Home grown	Italy MILAN — Home grown soft	Nether- lands ROTTER- DAM — Home grown
Average 1913..	100	100	100	100	100	100	100	100	100	100
10 January 1913	92.6	103.0	102.0	90.2	100.1	100.4	100.2	99.1	105.0	
13 January 1922	129.4	124.4	205.4	128.9	3,790.8	298.0	257.9	134.0	457.3	
3 Nov. 1922....	120.3	131.2	150.2	148.0		393.9	304.6	124.9	434.2	118.8
10 Nov. 1922....	120.9	130.1	149.8	131.8	130,216.2	404.0	304.6	129.8	430.6	122.5
17 Nov. 1922....	129.8	135.7	144.9	142.8	122,674.7	383.8	289.4	121.4	416.4	128.9
24 Nov. 1922....	127.1	133.4	146.5	138.7	120,663.7	348.5	288.5	129.8	416.4	128.9
1 Dec. 1922....	125.0	135.2	146.5	135.8	149,824.0	343.4	291.2	125.6	409.3	116.3
8 Dec. 1922....	122.0	134.6	141.6	134.7	155,354.4	338.4	298.3	120.0	387.9	116.3
15 Dec. 1922....	123.7	140.4	136.7	138.2	151,835.1	333.3	296.5	120.0	387.9	118.8
22 Dec. 1922....	126.0	142.9	139.1	141.0	141,779.8	338.4	302.8	115.8	395.0	118.8
29 Dec. 1922....	123.4	140.7	142.4	140.5	155,857.2	343.4	296.5	117.2	395.0	n.q.
5 Jan. 1923....	121.7	132.1	139.9	137.0	167,923.6	343.4	310.0	116.7	395.0	113.8
12 Jan. 1923....	123.6	133.8	141.6	136.4	195,072.9	353.5	302.8	118.8	391.5	113.8

THE AGRICULTURAL GAZETTE OF CANADA

PRICES AND OCEAN FREIGHT RATES REDUCED TO CENTS

Products Markets and Descriptions	5 Janu- ary 1923	1 Decem- ber 1922	3 Novem- ber 1922	Freights and Voyages	5 Janu- ary 1923	1 Decem- ber 1922	3 Novem- ber 1922
WHEAT (cents p. 60 lbs.)				OCEAN RATES OF FREIGHT (WHEAT AND MAIZE).			
<i>Canada:</i> Winnipeg: n° 1 Manitoba	106	110	106				
<i>United States:</i> Chicago: No. 2 Winter...	119½	122	118½	(cents p. 100 lbs.)			
Minneapolis: No. 1							
North.....	123	118	120	<i>Rumania:</i>			
New York: No. 2 Winter	135	136	138½	Danube to U.K.....	17	21	22
<i>India:</i> Karachi: Karachi white.	122	123	122	Danube to Genoa.....	16	20	20
<i>Argentina:</i> Buenos Aires: Barletta...	122	118	125	<i>Canada:</i>			
<i>Germany:</i> Berlin: Home grown....	112	101	.....	Canada to U.K.....	18	19	15
<i>Belgium:</i> Antwerp: Home grown..	121	118	136	<i>United States:</i>			
<i>France:</i> Paris: Home grown.....	160	152	159	New York to Liverpool..	10	14	14
<i>Great Britain:</i> London: English.....	116	121	119	North. Range to U. K.			
Liv. and Lond.: No. 1				cont.....	16	16	11
Man.....	139	139	141	North Range to Genoa.	22	21	17
Liv. and Lond.: No. 2				North Pacific Ports to			
Win.....	139	140	139	U.K.....	38	38	37
Liv. and Lond.: Pacific.	154	n.q.	146	<i>Argentina:</i>			
Liv. and Lond.: La Plata	140	139	142	Plata (i) Down River-			
Liv. and Lond.: Aus-				U.K.....	27	27	24
tralian.....	153	n.q.	145	Plata (2) Up River-U.K.	29	29	26
Liv. and Lond.: C. W.				<i>India:</i>			
Kar.....	150	147	146	Karachi to U.K.....	28	28	27
<i>Italy:</i> Milan: Home grown				Rangoon to U.K. (3)...	34	33	26
soft.....	154	149	141	<i>Australia:</i>			
<i>Netherlands:</i> Rotterdam: Home grown	121	124	125	Australia to U.K.....	45	48	45
RYE							
(cents p. 56 lbs.)				COTTON FREIGHTS			
<i>United States:</i> Minneapolis: No. 2.....	81½	79	78	(cents p. 100 lbs.)			
<i>Germany:</i> Berlin: Home grown....	96	84	.....	<i>United States:</i>			
<i>Belgium:</i> Antwerp: Home grown..	97	90	95	New York to Liverpool..	25	25	25
<i>France:</i> Paris: Home grown.....	118	102	105	New Orl. to Liverpool....	50	50	50
<i>Netherlands:</i> Rotterdam: Home grown	104	103	102				

Directory of the Department of Agriculture

Minister.....The Honourable W. R. Motherwell.

Deputy Minister.....J. H. Grisdale, B.Agr., D.A.Sc.

Commissioner, Dept. of Agriculture.....Duncan Marshall.

Assistant Deputy Minister and SecretaryLt.-Col. A. L. F. Jarvis, I.S.O.

The Dominion Experimental Farms, Director, E. S. Archibald, B.A., B.S.A.

Functions—To administer the Central Experimental Farm at Ottawa, twenty-one branch farms, eight sub-stations, eighty-six illustration stations, and two tobacco stations. The divisions of work are: Administrative, Chemistry, Horticulture, Cereals, Poultry, Animal Husbandry, Forage Plants, Bee, Tobacco, Botany, Field Husbandry, Flax, Illustration Stations, and Extension and Publicity.

Health of Animals Branch.....Veterinary Director General,
Frederick Torrance, B.A., D.V.S.

Functions—To administer enactments for the protection of live stock from contagious diseases, and to inspect meats, meat products and canned foods; to conduct research work.

Live Stock Branch.....Commissioner, H. S. Arkell, M.A., B.S.A.

Functions—To develop the live stock industry through the use of superior stock; to improve marketing facilities; to administer The Live Stock and Live Stock Products Act.

Dairy and Cold Storage Branch.....Commissioner, J. A. Ruddick.

Functions—To develop the dairy industry; to inspect public cold storage warehouses; to carry on shipping experiments; to administer Dairy enactments.

Seed Branch.....Commissioner, George H. Clark, B.S.A.

Functions—To encourage the production and use of pure seed; to test and inspect seed; to inspect feed manufacturing plants; to inspect Fertilizers; to supply seed in case of shortage.

Entomological Branch.....Dominion Entomologist,
Arthur Gibson, F.E.S., F.E.S.A.

Functions—To investigate injurious insects and methods of control; to enforce the Destructive Insect and Pest Act.

Fruit Branch.....Commissioner, G. E. McIntosh

Functions—To develop the fruit industry; to enforce the Inspection and Sales Act as it relates to fruit, fruit packages and potatoes; to enforce The Root Vegetables Act; to adjust transportation difficulties.

International Institute of Agriculture... Commissioner, T. K. Doherty, LL.B.

Functions—To represent Canada at the International Institute of Agriculture at Rome; to publish world agricultural information and statistics; to maintain the departmental library.

Agricultural Instruction Act Branch... Commissioner, (Acting),
J. H. Grisdale, B. Agr., D.A.Sc.

Functions—To administer the Agricultural Instructional Act, and to report upon the work carried on by the provinces under its provisions.

Publications Branch.....Director of Publicity, J. B. Spencer, B.S.A.

Functions—To publish "The Agriculture Gazette;" to distribute departmental publications; to prepare and issue other publicity matter.

